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Vale et Ave

As announced elsewhere, Mr. FitzHerbert Wright has resigned the presidency of the Council of Ironfoundry Associations after seven years of devoted work, and has been replaced by Mr. Noel P. Newman. We well remember the inaugural meeting, called by the ex-president, during the war, A ministerial edict had been issued requiring that the ironfoundry industry should be concentrated. There was a notion extant that because of the wide deviation in production per man-hour, many foundries were inefficient. That, as every practical foundry man knows, depends upon the volume, nature, size and complexity of the castings to be made. However, the matter was urgent, and rapidly there had to be created regional organisations for discussion purposes. At that time, there were within the industry dozens of manufacturers' associations in existence. Some were national, others were centred about one product or line of similar products, but none could speak on behalf of the whole industry. Mr. FitzHerbert Wright, by having a representative from each of these bodies, rapidly welded the associations into one composite body without limiting their historic activities. On behalf of the ironfounding industry we thank Mr. FitzHerbert Wright for all he has done. "*Au Revoir.*"

Great foresight was shown, for post-war conditions have stressed the need for every industry to possess a manufacturers' association organised on a national basis to negotiate with Governmental bodies on matters vitally affecting their interests. The association was soon called upon to produce a report on their industry; it later had to control development schemes, and finally to arrange for the financing of the ever increasing need for research and educational facilities. In more recent months, there has been the worry of the possibility of the nationalisation of the founding industry, and this has involved much hard work in the analysis and presentation of data to the Iron and Steel Board. Other strenuous activities have been the issue of a nationally unified costing system and standard conditions for the sale of iron castings. The various C.F.A. Bulletins have placed ironfoundries in full possession of the innumerable changes in legislation affecting their interests. As a newly-created body, it has tackled all these and many other problems to the entire satisfaction of the industry. To-day, it is difficult to imagine how the industry managed prior to the establishment of the C.F.A. Credit must be accorded in full measure to the staff; Mr. Kenneth Marshall, the director, and Mr. "Tommy" Parkinson enjoy the full confidence of the participating associations and their members.

The new president, Mr. Noel Newman, must surely be counted as one of the most industrious of industrialists. He is both a ferrous and a non-ferrous foundryman. He is the president-elect of the Institute of British Foundrymen and is active in a number of other co-operative organisations. At the moment he is in South Africa looking after his firm's interests in that great Dominion. As a president he possesses all the requisite qualities—personality, youth and energy, coupled with a successful business record gained in the conduct of an old-established family concern. The industry will wish him well in his new and very important office.

Contents

Vale et Ave, 223.—Anglo-American Productivity Council, 224.—C.F.A. Annual General Meeting, 224.—Synthetic Resin Core Binders, 225.—Conference on Newer Optical Techniques, 233.—Notes from the Branches, 233.—Founders Company Fellowships, 234.—New Catalogues, 234.—Standard Bronze Bars, 234.—A Reconstructed Foundry, 235.—Solid-fuel-burning Domestic Appliances, 237.—The Iron and Steel Institute, 238.—Forthcoming Events, 238.—Latest Foundry Statistics, 238.—Institute of Vitreous Enamellers, 239.—Publications Received, 239.—Steel Company of Wales, 240.—New Trade Marks, 240.—Naval Work for Shipbuilders, 241.—Private Enterprise in the Steel Industry, 241.—Henry Meadows' Preference Dividend Guaranteed, 241.—Company News, 242.—Parliamentary, 243.

Anglo-American Council on Productivity

The following members of the Anglo-American Council on Productivity (U.K. Section) will be sailing for the United States in the Queen Elizabeth on March 18:—Sir Frederick Bain, Mr. A. R. Baines, Sir Peter Bennett, Mr. Arthur Deakin, Mr. Lincoln Evans, Sir John Forbes-Watson, Sir Greville Maginness, Sir William Lawther, Mr. Jack Tanner and Mr. Tom Williamson. Mr. E. P. Harries, of the T.U.C., and Mr. H. S. J. de Haas, of the B.E.C., will be accompanying the party.

The other members of the Council and staff, including Sir Maurice Denny, Mr. C. B. Clegg, Sir Norman Kipping, Mr. Vincent Tewson, Mr. K. J. Burton, Mr. D. L. Walker, Mr. Norman Pleming and Mr. L. H. C. Tippett have already proceeded in advance. It is understood that the members will spend about three weeks in the United States and that their programme includes a series of meetings of the Council and its committees and also visits to various selected plants and factories.

AT AN EXTRA-ORDINARY GENERAL MEETING of the Institute of Vitreous Enamellers, held last week at Stoke-on-Trent, new subscription rates—Members £3 3s., Company Members £5 5s., Associate Members £2 2s. (£1 11s. 6d. under 25) and Associates 10s. 6d. per annum—were approved.

C.F.A. Annual General Meeting

At the annual general meeting of the Council of Ironfoundry Associations held last Thursday, Mr. N. P. Newman, of Newman, Hender and Company, Limited, Woodchester, Gloucestershire, was elected president. He replaces Mr. FitzHerbert Wright, who created the Association in 1941 and since that time has guided its destiny with such distinction that it now ranks amongst the leading manufacturers' associations in the country. Initially, he fought a winning battle against the Government's concentration scheme and since then he has so directed the affairs of the C.F.A. that to-day it commands not only the respect, but also the enthusiastic support of the great majority of the ironfounding industries. His untiring efforts and resourceful leadership on behalf of the industry were in some small measure recognised by the presentation of a refrigerator, a car radio and a silver tankard from his grateful colleagues. Mr. Carmichael, to whom the honour of making the presentation was given, briefly outlined Mr. FitzHerbert Wright's accomplishments. The reply from the retiring president contained a promise to help the C.F.A. wherever and whenever possible in the future.

PROVISIONAL DATES for the French Foundry Congress this year are October 17 and 18.

THE STEEL FOUNDERS' PRODUCTIVITY TEAM PHOTOGRAPHED PRIOR TO THEIR DEPARTURE FOR THE UNITED STATES.

Left to Right:—Mr. F. A. Martin (leader), Osborn Foundry & Engineering Company, Limited; Mr. J. W. Jackson (secretary), English Steel Corporation, Limited; Mr. W. Hammond, Edgar Allen & Company, Limited; Mr. W. L. Hardy, Lake & Elliott, Limited; Mr. T. H. Lamb, Head Wrightson & Company, Limited; Mr. R. MacNab, Clyde Alloy Steel Company, Limited; Mr. D. H. Aston, F. H. Lloyd & Company, Limited; Mr. D. Colbridge, David Brown Foundries Company; Mr. E. Daybell, K. & L. Steelfounders & Engineers, Limited; Mr. J. Jackson, Jackson Elphick & Company, Limited; Mr. S. Taylor, English Steel Corporation, Limited; Mr. H. J. L. Ray, F. H. Lloyd & Company, Limited; Mr. W. Scott, Carntyne Steel Castings Company, Limited; Mr. L. Skidmore, K. & L. Steelfounders & Engineers, Limited; Mr. H. W. Taylor, F. H. Lloyd & Company, Limited; and Mr. B. Travis, English Steel Corporation, Limited.

Synthetic Resin Core Binders*

By G. L. Harbach, A.I.M.

(*Continued from page* 208.)

Core Breakdown and Casting Finish

Foundry tests were carried out on uncoated cores made from sand mixtures with both U.F. and P.F. resins and a semi-solid binder, to determine the effects of section thickness, casting temperature and gas evolution on core breakdown, knock-out properties and casting finish. The method used was to surround specimen tensile cores (apart from the base, which was used as print) with ⅛-in., ¼-in., ½-in., and 1-in. sections of cast iron, gunmetal and phosphor bronze. Fig. 6 shows a set of three cores prepared with anchoring sprigs in position. The castings were made in green-sand moulds and all the conditions of the tests were standardised with the exception that the pouring temperatures were varied to suit the three different metals. Note was taken of the state of the cores when the castings were lifted from the moulds, the ease of knockout, and the surface finish of the metal before and after shot-blasting.

As regards core breakdown, the most noticeable feature was that the U.F. resin-bonded cores all fell out as dry dust, although in the ⅛-in. castings (weight 9 ozs.) portions of the core prints were still intact. The P.F. resin and semi-solid bonded cores only partially collapsed in the small sections—the core prints and parts of the main cores in the ⅛-in. sections being still present as hard lumps (see Fig. 7). There was little to choose in collapsibility between the results of the three different metals or between P.F. resin and semi-solid. Knock-out properties were good throughout, except where finning occurred, the U.F. bonded cores being most easily removed, especially when considering the ⅛-in. and ¼-in. sections.

Examination of surface finish of the casting after knocking out and after sand-blasting, placed P.F. resin as similar or slightly better in effect than semi-solid, with U.F. resin cores as the poorest, except in the larger sections of gunmetal and phosphor bronze, which showed honeycomb fins with P.F. resin and semi-solid, but only slight fins with U.F. resin duplicates. Figs. 8 and 9 depict the test blocks of cast iron and phosphor bronze, from which it will be seen the former are all clean castings, whilst the latter show the remains of large fins in the ½-in. and 1-in. sections, the smaller fins having been removed by shot-blasting. Finning is caused by expansion cracks and, as this defect is prone to occur when the sand grains are of similar size, core sands tend to produce fins, especially with alloys of the phosphor-bronze type. The results with P.F. and semi-solid were therefore not surprising, but the non-finning effect of the U.F.—unexpected at the time, but since confirmed by similar experiments, and also observed by other workers[2]—may prove useful under conditions where finning occurs with ordinary binders. The effects of gas evolution did not appear in any of the castings as blow-holes or scabs.

"Green" Properties

The results of the foregoing tests having shown the synthetic resins to be promising as core binders, attention was directed to full-scale foundry trials. During the laboratory experiments notes were taken of the technical qualities of the resins in comparison with normal binders, and it was realised the chief difficulty lay in the development of satisfactory properties in the green state, for the adhesive quality of the resins contrasted sharply with the oily nature of the usual materials. Whilst the liquid resins alone were capable of producing green bond in all stages up to a doughy mass (by varying the milling time), the "tacky" feel was never lost and sticking in core boxes—particularly in wooden ones—with poor flowability, appeared to be inherent disadvantages of the samples tried. Further difficulties were due to the presence of too much moisture and the absence of air-drying properties. In an endeavour to overcome these faults, paraffin, cereals, molasses and

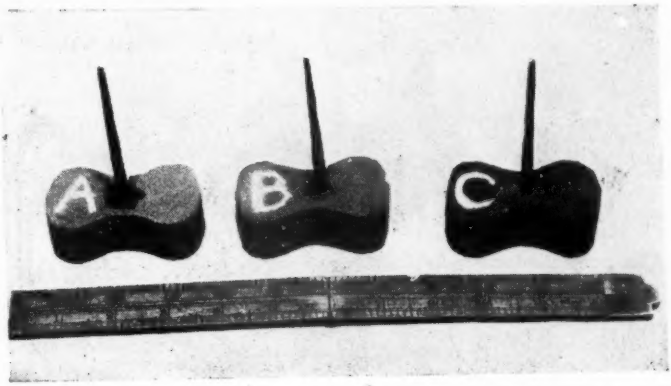

FIG. 6.—SET OF TENSILE CORES FITTED WITH ANCHORING SPRIGS FOR INSERTION IN A MOULD.

*A Paper read before the London Branch of the Institute of British Foundrymen, Mr. P. D. Pincott presiding, the Author is Chief Metallurgist, Worthington-Simpson, Limited.

Resin Core Binders

resin powders were added in small increments, separately and together. Although paraffin improved flowability and diminished the stickiness, and the other additions absorbed the excess moisture and developed variable air-drying properties, no mixtures duplicated completely the characteristics of oil binders in the green state. The results of some of the above experiments are detailed in Table V.

Fumes

During mixing, the smell of formalin caused some discomfort and, with U.F. resin, a fishy odour during casting and at the knock-out proved most objectionable. Improvement in foundry conditions being one of the objects of the investigation, it was decided that the full-scale trials be confined to P.F. resin mixtures, as preliminary trials had shown the fumes from this material to be far less offensive than those from oil binders. The decision was also influenced by the baking temperature required, as baking alongside oil-bonded cores was possible with P.F. resin, but not with U.F. resin.

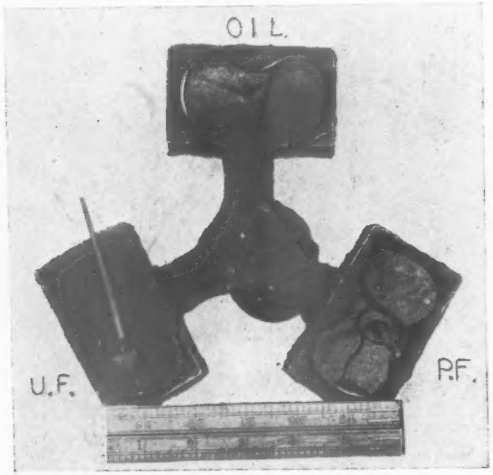

FIG. 7.—TEST CASTINGS SHOWING THE ENVELOPMENT OF CORES BONDED WITH VARIOUS MEDIA.

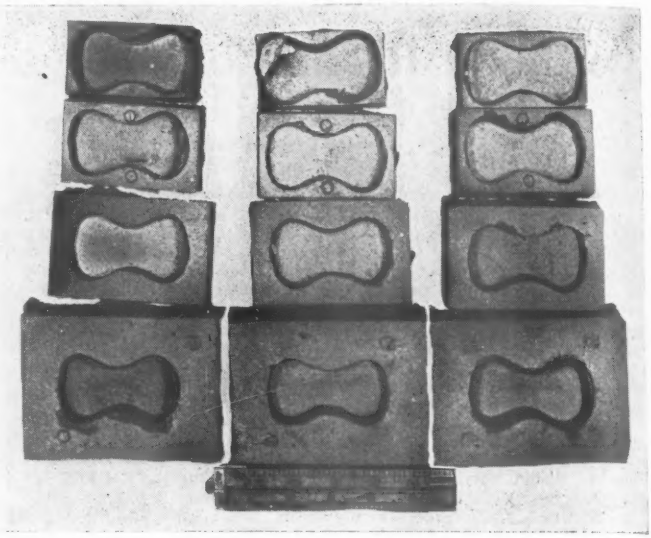

FIG. 8.—CAST-IRON TEST BLOCKS USING THREE CORE BINDERS. LEFT, U.F. RESIN; CENTRE, P.F. RESIN; RIGHT, SEMI-SOLID.

Large-scale Trials

The change from small to large mixtures was not only a matter of increasing the components. The foundry "Rotoil" machine, having a much milder action than the laboratory mill, failed to develop satisfactory green bond in half an hour, and the mixture, which had given good results on a small scale, had to be adjusted to suit the new conditions. It appeared that the "free" moisture content was a critical factor and trials were made with increased quantities of cereal binder and resin powder whereby the mixing time was reduced to 5 min. However, due to the reduced flowability compared with oil-sand mixtures, the normal batch size was reduced by 25 per cent. in order to ease the load on the motor. The following is a mixture used on production cores:—300 lb. dried Southport silica sand, 7½ lb. P.F. resin liquid, 2½ lb. P.F. resin powder, 6 lb. dextrin, and 1½ pints paraffin. Dried strength when baked at 170 deg. C., 330 lb. per sq. in.

A variety of cores have been made from the above and similar mixtures, some of which are illustrated in Figs. 10, 11 and 12. Production was practically normal when using metal core-boxes but, with wooden boxes, delays occurred due to sticking. In contrast, an advantage was gained in making impeller cores similar to the large one in Fig. 10 (12 in. dia.) for experience proved that good castings were produced from these cores when made without the usual supporting irons, thus saving the time usually taken in the bending and insertion of core irons. Figs. 11 and 12 show a segmented

core and the casting made from it. This type of core has to withstand both considerable handling during assembly and the local stresses during the final binding with wires. The results throughout compared favourably with standard cores and the casting was equally satisfactory. Since strainer bushes and cover cores (see Fig. 10, side and foreground) give a large volume of fumes in the foundry, they were used in moulds in groups of fifty to compare the conditions resulting from the use of oil and P.F. resin cores respectively. The conclusion drawn from the small-scale tests was completely confirmed, there being no doubt, from the opinions expressed by foundry personnel, namely, the P.F. resin fumes were far less objectionable than those from oil-bonded cores.

Review of Present Position

During the two years that synthetic resins have been under investigation as core binders, the supply position has improved considerably; the makers, aware of their possibilities, are now offering them to foundries; numerous articles and comments have appeared in the foundry Press; the British Cast Iron Research Association published a report[4] in 1948; B.I.S.R.A. organised a conference during the same year at which frequent mention of resin bonds was made;[5] several foundries have carried out trials, and some have adopted resins as substitutes for linseed oil. The resin most commonly employed is the U.F. type, as it not only yields a higher dry-strength than P.F. resin, but costs considerably less—£93 per ton compared with £150 to £180 per ton, both on the basis of 100 per cent solid resin.[6] The chief users are the light-metal founders but, contrary to expectations from the results of the breakdown-temperature tests, satisfactory castings have been made in bronze, cast iron and steel.[3] At least one large ironfoundry is using U.F. resin cores on a full production scale and the author is indebted to Mr. J. J. Sheehan, Managing Director, Conygre Foundry, for the privilege of seeing these cores in use and for permission to publish the following details:—

This foundry's present core production is 90 per cent. of the synthetic-resin bonded variety; the mixture given below having been in use seven or eight months, following lengthy experiments in co-operation with the resin manufacturers:—

450 lbs. Congleton sand.
7 lbs. Starch Compound.
3 lbs. Bentonite.
8 pints U.F. Resin liquid.
6 pints Water.
1 pint Paraffin.

All the components are added together and each batch, which is half the normal load of the "Rotoil" mixer in use, is milled for two minutes—one minute less than a full batch of oil-bonded sand. Bentonite is added to promote green strength and, although not essential for all cores, a single standard mixture is desired and the clay addition makes the moisture content less critical. With moisture controlled at 2 to 2.3 per cent., the green compression strength is 2.7 to 2.8 lb. per sq. in.; the "feel" and behaviour of the sand in core making, air drying and "life," all seem similar to oil sand, but the boxes are occasionally rubbed with a mixture of 40 per cent. linseed oil and 60 per cent. paraffin to prevent sticking. The cores are blacked in the green state by spray guns and baked at 180 to 190 deg. C. in a continuous stove, the cycle of which has been speeded up from 2¼ to 1¼ hrs.

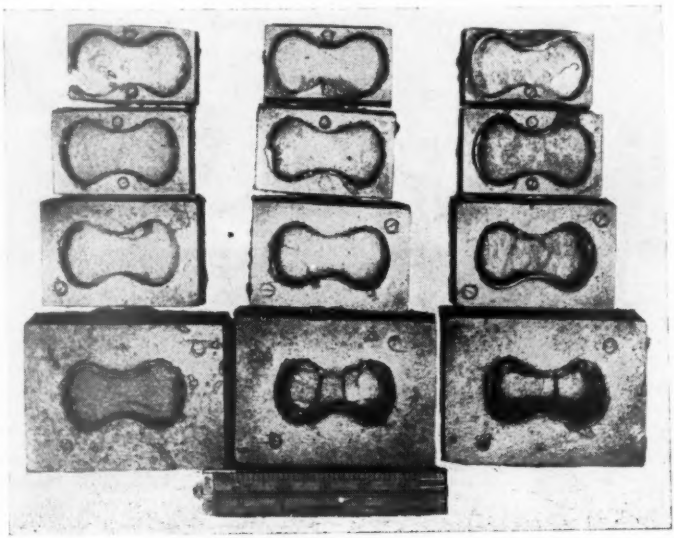

FIG. 9.—PHOSPHOR BRONZE TEST BLOCKS USING THREE CORE BINDERS. LEFT, U.F. RESIN; CENTRE, P.F. RESIN; RIGHT, SEMI-SOLID.

The increased throughput of baked cores has smoothed out a serious bottleneck in this foundry's production flow and was the chief reason for the change from oil sand. Fuel saving is a further advantage due to lower baking temperature and, as no oxygen is consumed in baking synthetic resin, the hot gases are recirculated through the firebox. The casting finish is excellent, with a noticeable absence of finning. Since this absence had accompanied the change in core binder, this confirmed the Author's experimental results. The

Synthetic Resin Core Binders

smell of formalin at the "unloading" side of the stove caused the Author more discomfort than the fishy fumes which, though objectionable, became less pungent as one became acclimatised.

Conclusion

Linseed oil is scarce and the supply position is unlikely to improve in the near future.[6] Synthetic resins provide an alternative to oil binders as regards dry-strength properties with advantages in production time and fuel consumption, but further research is needed to produce the desirable combination of green bond, flowability and non-stickiness with a balanced degree of air drying and absence of objectionable fumes.

The properties of synthetic resins can be varied over a very wide range, and it is anticipated that the makers will turn their attention to the manufacture of a type of resin specially suitable for core binding. The foundry industry may then be offered materials having all the properties required without any unfavourable characteristics. Thus, developments commenced with a view to overcoming a shortage may ultimately result in improving conditions in foundries.

TABLE V.—*Effect of Secondary Additions on Various Core Sand Mixtures.*

Base binder.	Addition.	Per cent. added.	Per cent. water.	Tensile strength, lb. per sq. in.	"Green" condition.	Dry condition.
2 PER CENT. RAW LINSEED OIL	None	—	—	315	Green bond very poor—oily	Very hard.
	Starch compound	0.25	0.50	280	Green bond poor. Oily and sticking to fingers and core box	All cores very hard.
		0.50	1.00	258		
		1.00	2.00	221	Green bond better. Oily	
		2.00	4.00	185	Green bond good but rather oily	
	Dextrin	0.25	0.10	292	Green properties similar to those obtained with starch	All cores very hard.
		0.50	0.20	290		
		1.00	0.40	229		
		2.00	0.80	204		
	Molasses	0.25	—	207	Green bond poor. Oily and sticky	All cores very hard.
		0.50	—	218	Green bond good. Left core box clean	
		1.00	—	223	Green bond very good. Similar feel to that of semi-solid mixes	
		2.00	—	235		
3 PER CENT. P.F. RESIN LIQUID	None	—	—	280	Green bond good but doughy mixture	Hard.
	Starch compound	0.25	—	320	Green bond very good but doughy and sticky. Better air-drying property	Very hard. Rather friable.
		0.50	—	190		
		1.00	—	150	Green bond good. Not doughy or sticky, but air-dried quickly	Friable.
		2.00	—	75		
		0.50	0.50	312	Mixtures became progressively more doughy and sticky, and of little use in foundry	Very hard.
		1.00	1.25	299		
		2.00	3.25	365		
	Dextrin	0.25	—	190	Little effect on the green properties of the sand	All cores hard.
		0.50	—	183		
		1.00	—	253	Rather less stickiness. Better air-drying properties	
		2.00	—	252		
	Molasses	0.25	—	359	All mixtures developed a good green bond, but became progressively more sticky, of little use in the foundry	All cores very hard.
		0.50	—	366		
		1.00	—	345		
		2.00	—	345		
U.F. RESIN LIQUID*	2 per cent. None	—	—	290	Rather wet and sticky	Hard.
	3 per cent. Starch compound	0.25	—	390†	Green bond fair. Rather wet and sticky	All cores hard.
		0.50	0.50	440†	Green bond good. Rammed well and left core-box clean	
		1.00	1.25	268†	Becoming doughy	
		1.50	2.25	268	Doughy. Little use in foundry	
	2 per cent. Dextrin	0.25	—	265	Green properties similar to those obtained with starch	Hard. Fairly hard. Friable.
		0.50	—	192		
		1.00	—	185		
		2.00	—	100		
	1½ per cent. Molasses	0.25	—	199	Green bond poor. Sticky	Rather friable.
		0.50	—	188	Green bond better. Not so sticky	
		1.00	—	263	Green bond fairly good, but still rather sticky	Very hard.
		2.00	—	—		

* Percentage of resin varied to keep the strength of the test core within the capacity of the tensile machine.
† Test piece of 0.75 sq. in. cross section used.

Acknowledgments

The Author wishes to thank the management of Worthington-Simpson, Limited, particularly Mr. W. S. Lawson, for the encouragement given during the investigations and for permission to publish the results. Also, he thanks his staff and foundry colleagues for their keen interest in carrying out the experiments and trials both in the laboratory and the foundry.

REFERENCES.

5 " Bonding Materials for Cores and Moulds," B.C.I.R.A. Research Report No. 207.
5 " Plastic Materials as Bonding Agents," J. M J. Estevez, B.I.S.R.A. Conference.
6 " The Supply of Oils," E. B. Harvey (Ministry of Food), B.I.S.R A. Conference.

DISCUSSION

The BRANCH-PRESIDENT said Mr. Harbach had proved that there had been a useful development in respect of core-making materials and compounds in the foundry industry. The work had been going on for some years. From his own experiments—which he referred to as being very small and insignificant—made three or four years ago with the urea formaldehyde resins, there appeared at that time to be unlimited possibilities in connection with making cores for light-alloy castings.

It would be a very sound idea—and he heartily endorsed it—that there should be a sub-committee of the I.B.F. Technical Council and of other interested bodies, in order to speed up the development of the synthetic resins for use in core-making, because undoubtedly there were very great advantages to be gained by their use. He believed there was one foundry in this country using a core binder of the synthetic resin type which was not baked in the oven at all, there being polymerisation or drying at atmospheric temperature. One could realise what it meant to a foundry to be able to dispense with baking ovens. He invited comments from Mr. Harbach on the matter.

MR. F. J. CREE said the Paper Mr. G. L. Harbach had presented was particularly interesting to him for the simple reason that the first job his father had given him in the core shop was to crush resin to mix with Mansfield sand. That was 65 years ago.

MR. HARBACH said he was glad to know that Mr. Cree was still using Mansfield sand, for it was a product local to Newark and was still in use in the same foundry where Mr. Cree had used it so many years ago.

MR. W. G. MOCHRIE asked what was the size of the test-pieces which Mr. Harbach had used in his laboratory experiments and from which he had obtained the information given in his tables.

MR. HARBACH replied that he had used only the standard test-pieces, 1 in. square at the breaking point, and with enlarged ends. They were all baked for one hour; unless otherwise specified, they were baked at the correct temperatures for the particular binder, *i.e.*, 170 deg. C. for the resins and 220 deg. C. for the oils.

MR. V. C. FAULKNER (Past-President of the Institute and of the London Branch) asked whether the cores were submitted to the drop test, whereby they had to be dropped from a height of 6 ft. on to a steel plate and, if so, with what results.

MR. HARBACH said that the shatter test, which was not yet standard, was used for green sand, for he had found that it gave better measurement of the cohesion of the sand than did the compression test. But he had not applied the shatter test to cores, mainly because, if there were some air-drying properties, as there were almost sure to be, the test results would vary according to the length of time the cores were left on the bench. One could not ensure, if the air-drying rate were high, that each specimen was tested after standing for an appropriate standard time.

FIG. 10.—SELECTION OF CORES MADE WITH P.F. RESIN-BONDED MIXTURE.

Resin Core Binders

The same difficulty applied to milling; if one milled the materials for three, four and five minutes respectively, entirely different results were obtained.

MR. W. A. TURNER asked if he were right in assuming that Mr. Harbach had had no experience at all of the high-frequency drying of cores. It seemed to him that there were two developments, *i.e.*, the use of the resins in cores, and high-frequency drying, either of which in itself was quite exceptional, but which together could bring about an absolute transformation in core-drying practice. In the United States they were drying cores of dimensions up to 1 ft. cube in as short a time as 4 secs., and small automobile cores were being dried in 3 secs. in continuous stoves.*

The matter appeared to be something on which, not only the founders and the resin manufacturers, but also the electrical equipment manufacturers, could work hand-in-hand, in order to effect as great a transformation in this country as had been effected on the other side of the Atlantic. Many snags had been experienced, but the majority of them had been overcome. The stove manufacturers in this country were nowhere near so far ahead as were our friends in America.

FIG. 11.—SEGMENTED CORE AND ITS COMPONENTS MADE IN P.F. RESIN-BONDED SAND.

MR. HARBACH said that he had no personal experience of di-electric heating. One of the difficulties, he believed, was that of the high first cost of the equipment; and the tendency was to apply the process to cores of more or less uniform size. Having seen a demonstration of di-electric heating at the B.I.S.R.A. Conference, he agreed that it was quite effective.

DR. R. H. BARFIELD, who said he had some experience of the di-electric heating of cores, believed that in England at the moment the cores were not being dried at speeds faster than two to three minutes. The process was quite simple; and for dealing with cores of varying sizes he did not think there was much difficulty provided there was the requisite space between the heating electrodes. Research work was being conducted to investigate the likely advantages of the method, and he believed that so far the results obtained had been very promising indeed.

MR. T. C. DISLEY, having recently returned from the United States, confirmed that the application of the new methods in synthetic-bonded sand had more or less revolutionised part of the heavy founding industry. The methods were applied to moulds as well as cores, moulds up to 10 tons being made, which required only about half-an-hour drying and were cast immediately, the cores being made of exactly the same material as the moulds. He had attended the meeting especially in the hope of hearing any suggestions for giving a stronger green bond to silica sands so that they could be used in the larger top parts or copes more satisfactorily. The moulds in the United States were made with very few supports and there were no cast-iron grids and only the bare minimum of mild-steel rods was used. Smaller moulds were not even blacked, although larger moulds were blacked with plumbago. Quite recently he had

* An article appearing in the [American] Iron Age dated February 3, page 116, is captioned "Core Baking in 2 minutes or 4 hours." It deals with high-frequency electronic core baking equipment for resin-bonded cores.—EDITOR.]

FIG. 12.—IMPELLER CASTING MADE FROM THE CORE ASSEMBLY SHOWN IN FIG. 11.

seen the process in operation for seven consecutive days. With improvements that appeared to be possible, many of the harder methods of foundrymen, he suggested, would be ended.

MR. HARBACH asked whether di-electric drying was used in these cases, or just skin-drying.

MR. DISLEY replied skin-drying was used, the moulds not being moved; and the heating was by ordinary paraffin or gas flames. Some of the moulds were sufficiently dry within five minutes.

MR. W. A. TURNER said he presumed that Dr. Barfield's reference to the di-electric drying of cores at speeds not faster than three minutes applied only to this country. Having seen cores dried in America, he said the space between the electrodes had to be strictly limited, but within those limits any height of core could be made, and, also, practically any length that would go on the conveyor and in the stoves. The largest stove he had seen in use would allow a core about 2 ft. 2 in. wide to be dried; the maximum height of core was about 11 in., the electrode space being about 12 in.

DR. BARFIELD agreed that there was a limitation in respect of height. His reference to speeds not faster than three minutes concerned only this country.

MR. DISLEY added that any foundryman who was fortunate enough to be able to visit America would find that he would be treated very well indeed. The Americans were very helpful, and did not profess to be any better than ourselves; indeed, they said that they were not so good as we in this country.

The "C" Process and Effect of Moisture

MR. J. FALLOWS did not think that much had been done in regard to the baking of moulds without adding moisture. Some work was being done in this country by his firm, and a reasonable amount of success was being achieved. The method they were using was in its infancy, but he hoped that the mould drying times, or perhaps he should say the mould forming times, would be round about two minutes. It was found that, in this method, the addition of even a small percentage of moisture had a very marked effect on the strength and physical properties of the resultant mould or core when using the phenol-formaldehyde resins. He asked whether Mr. Harbach could quote any results for tests when using the synthetic resins with no added moisture and with no clay present.

MR. HARBACH said that experiments with the 50:50 liquid had shown that there was too much moisture. A powdered resin of the phenol-formaldehyde variety was then tried, and it was necessary to put water to it in order to achieve any bond at all in the green state; otherwise it just did not make a core. The addition of powdered resin to the liquid resin to reduce the moisture content, had met with some success. Moisture was definitely necessary and, indeed, he and his colleagues had felt that the more moisture that the substance could carry, the higher would be its dry strength; but the limitation was that one soon had a sticky mess to handle in the green state, and that was out of the question.

MR. FALLOWS said that, if one mixed a given percentage of binder in some pure silica sand and heated it, without any moisture at all, on a plate, one obtained some rather surprising results. He and his colleagues were working some dry mixings and were getting quite fair results; but they had no moisture there to start with.

MR. HARBACH was rather surprised that any green bond at all was obtained without moisture; he wondered how it would take the shape of the mould and pattern.

MR. FALLOWS said he was referring to a process which had been mentioned in the FOUNDRY TRADE JOURNAL, called the "C" Process; he believed that there had been two references to it in the JOURNAL.* The cores that were made could be stored for six months before use, and remained in the same condition as when made.

MR. J. M. J. ESTEVEZ (I.C.I. Plastics Division) pointed out that it was impossible to mix phenolic resins with sand and to produce a mixture entirely free from moisture, because it was impossible to obtain a phenolic resin free from moisture. When resin condensed, moisture was eliminated. The "C" Process used resin with 5 to 7 per cent. of moisture. He had tried some experiments, though they were not as extensive as those conducted by Mr. Harbach, and had found that some moisture must be added, for the moisture content must be of the order of 3, 4 or 5 per cent. in order to achieve anything like satisfactory "green" strength. When the moisture content was increased beyond the minimum and the cores were eventually heated by stoving in the orthodox manner at, say, 200 deg. C., a considerable amount of the strength in the cores arose from a skin effect, due to the migration of the resins. That was found to be the case in the experiments of Cröning on the "C" Process.

MR. FALLOWS still held that the "C" Process was operated with no moisture content,† at any rate, so far as it was possible to have no moisture content when working in any climatic conditions such as prevailed in this country. Certainly there was not 5 per cent. of moisture.

MR. ESTEVEZ emphasised again that one could not obtain a phenolic resin which had no moisture.

MR. FALLOWS said there was no apparatus which would give a reading of the moisture content.

MR. ESTEVEZ remarked that comments on that could be extremely humorous.

The Randupson Process

MR. B. LEVY recalled that in 1938 there was a great development of a cement-sand process which, in his recollection, gave a very good green bond. In the north he had seen a very extensive plant which was employed solely on the production of moulds and cores in a cement-sand mix. The cores and moulds made with that mix were stripped, after the style of the jacket-type mould, and were left to air-dry; there was no

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* FOUNDRY TRADE JOURNAL, December 4, 1947, p. 289, and February 19, 1948, p. 181.

[† The original report on the "C" Process specifically mentions that no water is *added*. There is no mention in the report as to whether the resin used may contain *inherent* water, whether free or combined.—EDITOR.]

Synthetic Resin Core Binders—Discussion

stoving, no dressing and no re-touching. But somehow or other the process appeared to have remained static. To his knowledge several very prominent firms in the industry had put down extensive plants for producing such moulds and cores, as well as plants for breaking up the sand after casting. He believed one of the snags was the difficulty of reclamation of the used moulds; th wastage was considerable. Nevertheless, the cement-sand process gave very fine results, viewed from all possible angles. He wondered whether Mr. Harbach could say why the process was not more popular, and whether he had any figures by which to compare cement-sand with the resin-bonded sands.

MR. HARBACH said he had no personal experience of the cement-sand process applied to moulds. When he was first elected to the Sub-committee of the Joint Standing Committee on Conditions in Iron Foundries, some cement-bonded strainer bushes were tried with a view to reducing fumes, and they had worked quite well; the mixture was about the normal mixture used in moulds. As to the use of such mixtures for ordinary cores, he pointed out that their tensile strength was only about 60 lb. per sq. in., as compared with the 250 lb. per sq. in. dried strength of oil-bonded cores. He felt we should need to have a new technique amongst the moulders if they were to handle anything so frail, and which needed support from core-irons to a greater extent than oil sand; indeed, we wanted to get rid of the irons as far as possible. The process was patented, and perhaps someone present could give information about the position. The low strength might be the reason why the process did not appear to have gained in popularity during the past ten years.

Vote of Thanks

MR. P. T. HOLLIGAN, proposing the hearty thanks of the meeting to Mr. Harbach for his Paper, said that obviously he had devoted a tremendous amount of work to the preparation of the Paper, which was literally packed with facts from start to finish.

At the beginning of the Paper he had been kind enough to mention the Technical Committee of the Association of Bronze and Brass Founders; but that was sheer modesty on Mr. Harbach's part, for he had done all the work himself and had very conscientiously reported to the Committee. His colleagues there had taken a very great interest indeed in that work and had always tried to encourage him—not that he needed any encouragement in that direction—but it would not be right that they should accept any of the reflected glory. They had felt, however, and he believed Mr. Harbach also had felt, that the work was of such importance that he should be aided, rather than that he should carry the burden entirely alone. Therefore, Mr. Holligan suggested that consideration be given to the idea of forming a sub-committee of perhaps the I.B.F. Technical Council for the purpose of pursuing that type of research. He believed Mr. Harbach would welcome it, and one was sure that it would prove of great value to the industry.

DR. G. A. SKERL, who seconded, recalled that at the British Iron and Steel Research Association's conference in October, 1948, Mr. Harbach's contribution was one of the best of many good Papers presented; whilst the discussion at that meeting of the London Branch of the Institute had shown the great interest that foundrymen in that area were taking in the subject. Some foundries in the district were using synthetic-resin binders, and it had been hoped that the meeting might have heard from representatives of those foundries in the discussion.

As a maker of core compounds, Dr. Skerl was very interested in the materials put forward by the manufacturers of synthetic resins. Mr. Harbach had mentioned that to talk about urea-formaldehyde and phenol-formaldehyde resins was like talking about ferrous and non-ferrous metals, for there were such numbers of them; that was one of the difficulties, made worse by the fact that one could get very little information from the manufacturers about the materials that were being supplied. Having carried out experiments, with and without the assistance of foundrymen all over the country, he could see a great future for the synthetic-resin core binders; but much work remained to be done, combined work by both suppliers and foundrymen, in order to develop materials as good as the linseed-oil type of binder. There was no doubt that, for specialised types of cores, and on mass production, some founders could effect great savings by the use of synthetic resins and the di-electric method of heating.

Dr. Skerl suggested that, when the B.I.S.R.A. conference Papers were reproduced, they should form the basis of another Paper to the London Branch of the I.B.F., because the discussion of all aspects of the use of synthetic-resin core binders was very provocative and he felt sure it would be of the greatest interest to the members of the Branch as foreshadowing a possible future major change in foundry practice.

(The vote of thanks to Mr. Harbach was carried with acclamation.)

Author's Reply

MR. HARBACH, in his response, said that the work he had described was done mainly, not by himself, but by his staff; he came in as reporter and was accorded a vote of thanks, which he would have great pleasure in passing on to those who had really done the work. However, perhaps he could claim to have to some extent provided inspiration, so that he might be able to accept a share. The problem of the synthetic binders was worthy of very serious consideration in the foundry, for by the use of those materials we might be able to eliminate the foul fumes which arose from the use of linseed oil. When using urea-formaldehyde, one had changed the smell to a fishy one. Melamine resin had the properties of urea-formaldehyde without the fishy smell, except in slight degree. He had the feeling, therefore, that if the resin manufacturers really studied the problem, they would do much to help the foundryman in the desired direction. He welcomed the idea of an Institute Sub-committee, as suggested by the Chairman, Mr. Holligan and Dr. Skerl, to keep in touch with new developments and to carry out practical experiments.

(*Concluded on page* 233 *at foot of column* 1.)

Conference on Newer Optical Techniques

In order to encourage the application in the metallurgical industry and research of known optical techniques, the British Iron and Steel Research Association is to hold a conference on May 9 and 10 at Ashorne Hill, Leamington Spa. The general chairman will be Mr. E. W. Colbeck, of Hadfields, Limited. The practical applications of three techniques will be the subjects of the discussions, together with essential theoretical treatments, so as to describe each technique as a laboratory art. There will also be practical demonstrations throughout the conference.

The three techniques are:—(*a*) phase contrast microscopy; (*b*) the multiple beam interference technique; and (*c*) the reflecting microscope. Of these, apparatus for the first two are commercially available, and the third is being developed with the aid of a Nuffield grant.

The phase contrast microscope, which has been largely developed by Dr. Burch, at Bristol University, is already used to quite a large extent in universities, particularly in biological work in which "transmission" technique can be employed with light shining through the specimens. In metallurgical work reflection technique must be used, and by its means greatly increased contrast may be obtained to accentuate very small differences. It is thought that this could make a most useful tool, both for routine testing and in research.

The multiple-beam interference technique has been developed by Professor Tolansky at Manchester University and the Royal Holloway College. This is essentially a research tool for studying surface topography and gives phenomenal magnification in depth, so that height changes of the order of 20 to 40 Angström units may be estimated. Both of the above instruments are available commercially.

The Burch reflecting microscope has also been developed at Bristol University, and now with the aid of a Nuffield grant ten are being manufactured. The instrument gives the advantage of a large working distance, and can therefore be used for examining specimens maintained under special conditions, for example at high temperatures. It has the further advantage that the instrument can be focused with visible light before using ultra-violet or infra-red ray. In this connection, Dr. Bouwers is coming over from Holland to explain and discuss his modifications to the instrument.

Application to attend the conference and for accommodation at Ashorne Hill should be made to the Metallurgy Division, B.I.S.R.A., 11, Park Lane, W.1.

A development at Coneygre Foundry, which had been mentioned by the Branch-President, was even more revolutionary than that of the synthetic resins reported in the Paper. It was an air-drying compound—the subject of a patent—which worked like ordinary oil sand and dried on the bench. It seemed to be a development of outstanding importance, and no doubt we should learn more about it in the future.

Notes from the Branches

Scottish—Falkirk Section

A meeting of the Falkirk Section of the Scottish Branch of the Institute of British Foundrymen was held in the Smoke Room of the Temperance Café, Lint Riggs, Mr. John N. Reid in the Chair. The normal business of the evening having been attended to, the Chairman introduced Mr. William W. Braidwood, of the Research and Development Department of the Mond Nickel Company, who thereupon presented his Paper, "A Decade of Progress in British Ironfounding."

MR. REID congratulated Mr. Braidwood on his excellent treatment of his subject, and opened the discussion by asking whether, in the light of the investigations and findings of Rambush and Taylor, great care was still necessary in the even charging of a cupola.

MR. BRAIDWOOD, in reply, emphatically confirmed that carefully-prepared cupola charges would always be an advantage.

MR. WM. W. BLAIR expressed interest in the use of syphon bricks in the cupola, and requested some further information on the subject.

MR. R. R. TAYLOR suggested that the use of substitute core materials did not represent progress in ironfounding. He expressed a desire to see some work done in connection with the control of pouring speed in the manufacture of castings.

MR. BRAIDWOOD said, with reference to Mr. Taylor's second point, that he would like to see the results of Mr. Taylor's own work on pouring speeds in print. In his opinion, this would yield some considerable information.

MR. R. URE wondered whether there really was any difference between the fluidity of an iron containing 0.3 per cent. phosphorus and one containing 1.1 per cent. phosphorus, all other factors being equal. Mr. J. G. Pearce had at one time made a statement which he (Mr. Ure) had taken to imply that there was really no difference. This question Mr. Braidwood referred to the hon. secretary, Mr. T. R. Goodwin, who suggested that Mr. Ure might be confused by the fact that the relative amount of change in fluidity decreased as phosphorus content increased. There was, however, a decided difference in fluidity between irons of the phosphorus contents quoted.

MR. EADIE quoted some modifications of syphon-brick method of cupola tapping.

MR. TAYLOR expressed interest in the Walbro cupola attachment, and was given the FOUNDRY TRADE JOURNAL reference describing this arrangement.

MR. D. M. WEBSTER proposed a hearty vote of thanks to Mr. Braidwood for his excellent Paper. After being duly seconded, the motion was carried unanimously.

Before closing the meeting, the PRESIDENT referred to the loss by death since the last session of two very keen members, Mr. Thos. Tyrie, late Scottish Superintendent of the British Cast Iron Research Association, and Mr. J. M. Primrose, late managing director of Grangemouth Iron Company, Limited, the latter gentleman having died in Canada.

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*Shortly to be Printed.

Founders Company Fellowships

The Worshipful Company of Founders of the City of London, to whom Ordinances were granted as long ago as July 29, 1365, was originally formed for the purpose of ensuring that work by founders in the City of London should only be with good metal. The Company, believe that the development and progress of founding, and the science of metallurgy, must depend very largely on attracting to the industry highly trained men of evident talent. To that end the Company awards fellowships so as to give facilities for advanced education to men who have already completed their normal course of training. Such training to have been at a university or to be at least of a high educational standard.

These Fellowships, which are called "Founders' Company Fellowships," are available to those candidates who appear likely to be able to make good their careers in the founding industry if afforded the facilities for further courses of study designed specially to qualify them towards that end. Fellows are chosen by a Selection Committee from among applicants who have completed such training as mentioned above, in chemistry, physics, metallurgy (more especially in connection with molten metal) and allied sciences. In addition to this, some previous practical foundry training and experience together with, if and when possible, the Diploma of the National Foundry College, would carry weight with the Selection Committee. At the same time, the Committee pays considerable attention to the character and powers of initiative of the candidate.

The course to be followed by the Fellow will in each case be chosen with the object of adding to his scientific equipment that which appears to be most necessary for adapting him to some branch of the founding industry. There will be no limitation to the nature of the course which may be selected; it might include research, a period in works or foreign experience; due regard being paid to the particular wishes and aptitude of the Fellow. The normal value of the Fellowship is £300 per annum and it will be renewable for a second year and in special cases for a third year. Payment will be made monthly in advance to the Fellow's bank.

One Fellowship is granted each year so that in ordinary circumstances there are two Fellowships in existence. The Fellow will be expected to devote his whole time to work approved by the Company and to submit periodical reports of progress, if required. No other work for which payment would be received shall be undertaken by him without the consent of the Master of the Company and no other grant, Scholarship or Fellowship shall be held concurrently with the Fellowship unless the Selection Committee approve. Candidates should not be less than 21 years of age on September 1 of the year of application and will be required to furnish particulars of their name, address, age, academic and other training, etc. They will subsequently be required to attend before the Selection Committee. The tenure of the Fellowship dates from September 1.

Applications must be received not later than May 1 by the Clerk of the Worshipful Company of Founders, Founders' Hall, 13, St. Swithin's Lane, E.C.4, to whom all inquiries should be addressed. The Company does not bind itself to award a Fellowship in any one year.

New Catalogues

Safety Goggles. Safety Products, Limited, of St. George's House, 44, Hatton Garden, London, E.C.1, have sent us a leaflet which describes and illustrates a modified type of safety goggle. This incorporates a number of new features such as the ability to replace the lenses without the sides, and sides adjustable as to length so as to avoid that discomfort resulting from pressure behind the ears. A further feature which will be appreciated by melters is the possibility of adding a little leather "curtain" over the nose bridge. Steel melters often get an unsightly red mark on the nose bridge through the heating-up of the metal bridge. Several other novel features are incorporated.

Patternshop Equipment. How very different is the latest catalogue issued by J. W. and C. J. Phillips, Limited, of Pomeroy Street, New Cross, London, S.E.14, from their advertisement which appeared in the first issue of this Journal in 1902. At that time they were advertising (by to-day's standards) a rather crude-looking core-forming machine. In this new catalogue, about 60 products ranging from "arrows" to "vices" are listed. The stiff covers are carried out in two shades of blue and each page is relieved by a blue strip at the top and bottom, making a pleasing layout. The illustrations of the various components are clear and courage has been shown in listing the prices against the innumerable sizes, though, of course, there is the usual "change" paragraph in the terms of business section. The increments at least will be proportional. We congratulate those responsible for having turned out a very commendable contribution to the trade literature of the foundry supply group.

Standard Machined Bronze Bars

In order to preclude the possibility of surface defects, the Glacier Metal Company, Limited, has decided to change over from "as cast" phosphor-bronze bars to the marketing of a range of bars supplied machined on the outside diameter. Having built up stocks sufficiently adequate to ensure immediate delivery, the company has announced the general availability of this material to engineering industry. Users have a choice of 151 stock sizes, cored and solid, all 13 in. long. The bars are supplied semi-finished on the outside diameter with an allowance of 0.020 in. for finishing by the user. This means that in many cases a user can select bars where a 0.010-in. cut will produce the finished size. Those already using this material are reporting favourably on the advantages of the machined diameter in terms of reduced tool wear, shorter machining time and the wastage of considerably less metal than was formerly the case.

A Reconstructed Foundry

Conversion of the Butlin Foundry at Wellingborough

By V. C. Faulkner

Of the millions of pounds invested in the foundry industry since the war, only a small proportion has been spent on the provision of new buildings and their equipment. In most cases it has been a case of "make do and mend" on a large scale plus the acquisition of essential new plant. Typical of such a case is the re-organisation of the well-known Butlin Foundry at Wellingborough. This concern dates back to the time when an iron foundry was indistinguishable from a blast-furnace plant. At any rate, there exists in the office a piece of metal in a glass case commemorating the first cast of metal in 1854.

Some years ago, the works passed into the hands of the United Steel Company, Limited, who used it for the provision of castings for their various iron and steel plants. During the 1939 war, however, the best of the three foundry buildings—a substantial, light, airy construction—was given over to the making of malleable Bren-gun carrier wheels. For this purpose, a large amount of mechanised plant was installed.

After the war, the Nuffield organisation, requiring extra foundry capacity for the production of components for the Nuffield Universal tractor, bought the plant, which is now being operated by Morris Motors, Limited, Engines Branch, with Mr. L. W. Bolton, A.M.I.Mech.E., as manager. Primarily, the problem to be solved was the quantity production of precision grey-iron castings in a concern, the personnel of which was quite unaccustomed to this class of output. Amongst the early decisions taken were (1) the scrapping of the oldest foundry building, as it was quite unsuited for modern foundry practice, (2) to concentrate all the engineering castings in the second foundry, which is reasonably well adapted for the production of both medium (up to 5 tons) and light engineering jobbing work, and (3) to dismantle and sell the malleable melting and annealing plants.

The Position To-day

Full use is being made of the existing sand plant. Here, sand from a Sinex vibrating knockout and consisting of 50 per cent. of 26a Leighton Buzzard with 50 per cent. Congleton sand bonded with a proprietary clay is passed on to a short length of conveyor belt surmounted by an overhead magnetic separator by Electro Magnets, Limited. A second belt takes the sand up aloft to a vibrating screen carrying a half-inch mesh. Oversize material is rejected outside the shop. The sand passing through the screen is fed into a hopper of 100 tons capacity. This hopper has at its base two rotating tables fitted with ploughs. The sand so ploughed-off is transferred by a short length of conveyor to the sand mill, and over this belt there are mounted two machines for adding, automatically, the bond and the coal dust. The sand is conditioned by a 30 ton per hour SB3 continuous sand mill by Foundry Equipment, Limited. The prepared sand is elevated by belt conveyor and transferred to a belt spanning four Stone Wallwork W.T.563c machines. Fig. 1 shows a general view of the mechanised portion of the foundry. Additionally, there is another plough (all these are operated manually) to feed a sand-throwing machine, made by Foundry Equipment, Limited. This machine is mainly engaged in the ramming-up of the main-frame and gear-box moulds for the tractors. Experience has shown that to obtain a perfect mould a certain amount of peg ramming is called for, and this, in the earlier stages, is effected by a rubber-ended rammer. This job of attaching the rubber to the metal has been carried out quite successfully by a local firm. The later stages are undertaken by rammers having a leaden peg. Fig. 2 shows the line of moulding machines and the sand-throwing machine.

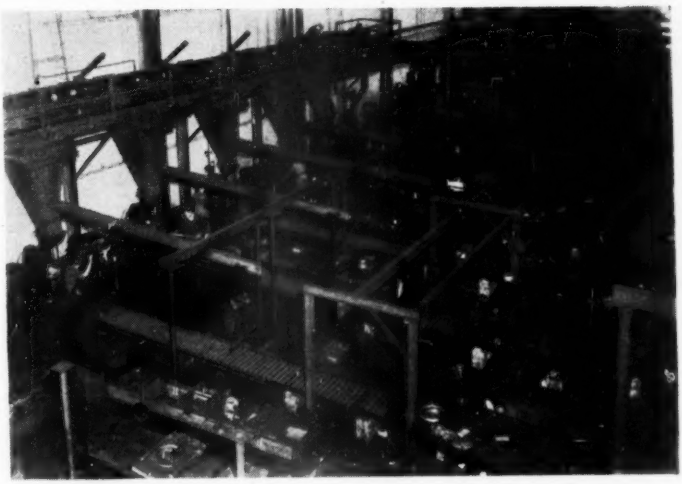


FIG. 1.—GENERAL VIEW OF THE MECHANISED SECTION.

A Reconstruction Foundry

The whole layout is serviced by a network of roller conveyors, whilst the handling of the boxes from the machines and the sand thrower is effected by air hoists. Plenty of space has been allocated on the gravity roller conveyors to allow time for coring up and inspection. On the side of the shop opposite to the moulding machines is a power-driven platform mould conveyor passing quite near to the cupola, but separated from the knock-out by a series of roller tracks, so that the larger moulds can be stored for cooling before stripping.

The plant so far described takes care of the relatively heavy and light work, but for the medium-class, such as the rear-axle case, a new plant is coming into being. Moulding is to be effected on a pair of RD5 machines made by the British Moulding Machine Company, Limited. The sand supply comes from an adjacent Sinex knock-out, feeding a length of belt conveyor provided with a magnetic separator. The sand is then elevated to feed an 8-ft. August-Simpson batch mill. The present production from this foundry is of the order of 50 tons a week, but has to be stepped up to 200 tons as soon as possible.

FIG. 3.—PART OF THE CORE-SHOP OF THE WELLINGBOROUGH FOUNDRY, SHOWING AN ARRANGEMENT OF INDIVIDUAL BENCHES ALONG A BAND CONVEYOR.

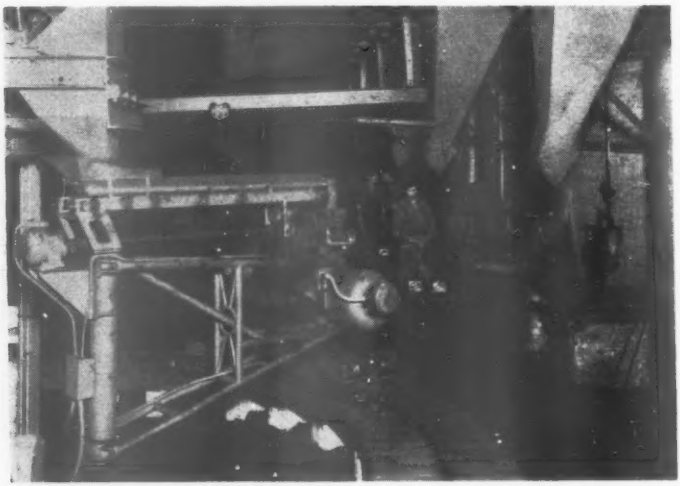


FIG. 2.—MOULDING MACHINE LINE WITH AN AUTOMATIC SAND RAMMER IN THE FOREGROUND.

Core Shop

This shop (partly shown in Fig. 3) is housed in a bay separated from the foundry and located on the opposite side to the moulding machines—a feature involving an additional burden on transport. Core making is by male labour on neat benches placed on either side of a 70-ft. long steel band conveyor. The sands used are the same as those used in the moulding sand, but are bonded with proprietary brands of core binders based on linseed oil and dextrine. The conveyor feeds an oil-fired Acme continuous vertical core stove. Rubber-tyred trucks take the finished cores to the moulding stations. This department is awaiting the delivery of a modern sand dryer. This will be worked in conjunction with a cooler, storage hopper and a B-type 10-cwt. capacity Fordath mill.

Melting

The melting plant consists of four cupolas by the Construc-

tional Engineering Company, Limited, two of 9 tons and two of 4 tons per hr. capacity. The latter are at present in use on alternate days. The 5-cwt. cupola charges are weighed out on the platform, which is serviced by a hoist, and hand-charged. The quality of the metal is controlled by chemical analysis and a chill test. The depth of chill thrown is kept at a standard by the addition of S.M.Z. alloy. The liquid metal is tapped into 5-cwt. ladles suspended by electric hoists from monorails running adjacent to the mould conveyor.

Fettling

The fettling shop is well housed in a modern lofty shop, which is at the moment being extended. When finished it will also house some of the pattern-making activities. The plant already installed includes a pair of 90-in. rotary-table Sand Wizards, six Luke and Spencer double-ended grinders, a paint-spraying booth and a number of HiCycle high-speed portable electric grinders. Delivery is to be expected shortly of a large Tilghman plant. Before despatch, and where it is considered necessary, the castings are mounted in jigs for the testing of their dimensional accuracy.

The pattern shop is also being extended and a number of new machines are on order. There is ample room around the foundries for enlarging existing buildings or for the erection of new ones. The site is close to the main London to Leicester main line and possesses its own sidings.

The amenities at present provided include shower-baths and a modern canteen with seating capacity for 250 workpeople. This question of amenities is in the forefront of consideration which is being given to further development.

To ensure the success of such an enterprise as this, there are two main factors to which attention has to be directed: economic production and raw material control. The first is a lengthy job involving, even under modern conditions, much trial and error. The second can and is being successfully effected. Reference has been made to metal control, and an examination of the charts and other data discloses how, with the passage of time, the kinks in the curves have been ironed out. As for sand control, Mr. Bolton established as his standard the following properties: moisture 5 per cent.; permeability 60; green strength 11 lb. per sq. in., and the shatter test index of 70 to 80. The latter test involves the falling of an A.F.S. test-piece a distance of 6 ft. on to a steel plate. The shattered core is then placed on a ½-in. mesh sieve and the amount remaining in the sieve is expressed as a percentage of the total weight. The graphs of the results given since the inception of the re-organisation show continuous improvement so that nowadays, the variations encountered are at a completely satisfactory minimum. The writer very cordially thanks Mr. Bolton for the reception accorded to him on the occasion of his visit to Wellingborough and for supplying the data upon which this article is based.

Solid-fuel-burning Domestic Appliances

The Report on the Industrial Art Bursaries Competition, 1948, organised by the Royal Society of Arts, includes the following information:—

In the preliminary stage, candidates were required to submit eight designs for household equipment, including exteriors of domestic solid-fuel-burning appliances. Only four candidates submitted designs in this stage of the competition; the "jury" decided to allow all four to participate in the final stage, which was worked under invigilation in thirty hours during the three weeks commencing November 8. In this final stage candidates were required to prepare a design for a solid-fuel free-standing cooker with boiler, in accordance with specifications supplied to them. The "jury" unanimously recommended the award of the Bursary to Mr. Ronald Thomas John Homes (L.C.C. Central School of Arts and Crafts), who had obviously made the most of his 1947 Bursary and progressed considerably during the past year. They felt his improvement fully justified the holding of a competition for this type of design. They also very highly commended the work of Mr. Colin Tonks, a draughtsman in the drawing office of the Eagle Range & Grate Company, Limited, Aston, Birmingham, and strongly recommended to the Bursaries Board that an additional award be made to him. They agreed that he would have been awarded the Bursary if last year's prize-winner had not again been an entrant. His designs showed sound practical knowledge, but his presentation was not quite up to the standard of some of the other competitors from art schools. He would most certainly gain by having some artistic training, although his designs show considerable taste and ingenuity.

The "jury" commended the work of Mr. Martyn Omar Rowlands and Mr. Douglas Arthur Webb (both of the L.C.C. Central School of Arts and Crafts) and recommended that they should both be given the opportunity to visit foundries. They still felt that this field of design was one in which young designers could find great opportunities, and they urged more schools to encourage students to enter it.

IN VIEW OF THE APPROACHING RETIREMENT of Lieutenant-Colonel W. French, the City and Guilds of London Institute has appointed Major-General Cyril Lloyd administrative director of the department of technology as from October 1, when he will relinquish his present post as Director of Army Education.

LAST TUESDAY, Aga Heat, Limited, organised at the Dorchester Hotel, London, a conference of their distributors, which concluded with a dinner at which Mr. V. Jobson presided. A feature of the evening was a telephone conversation between Mr. Wren, the managing director of Aga, and Mr. Duncan Morgan, their Australian agent, speaking from Sydney. Mr. Jobson announced that the recent closing of the South African market for cookers meant a severe loss to the industry.

The Iron and Steel Institute

Annual General Meeting

The Annual General Meeting of the Institute will be held on April 27, in the Lecture Theatre, Central Hall, Westminster, London, S.W.1, and on April 28 at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1. A buffet luncheon will be available in the Library, Central Hall, Westminster, on April 27, and a members' luncheon will be held at the Dorchester Hotel, Park Lane, London, W.1, on April 28, at 12.45 for 1.15 p.m.

The official business to be transacted at the opening meeting will include a resolution to amend certain bye-laws, formal notice of which was given at the Autumn General Meeting in 1948. The morning session on the Thursday should be of special interest to members of the Iron and Steel Engineers' Group. Members wishing to take part in the members' luncheon on Thursday, April 28, are asked to apply to the Secretary as soon as possible. Tickets for the members' luncheon cost £1 5s. each. Members may bring guests, but ladies, other than members and associates, cannot be invited.

Programme

WEDNESDAY, APRIL 27, 1949

9.45 *a.m. to* 1.15 *p.m.—Morning Session*: Presentation of the Bessemer Gold Medal for 1949 to Prof. J. H. Andrew, D.Sc.; presentation of the Sir Robert Hadfield Medal for 1949 to Mr. M. W. Thring, M.A., F.Inst.P.; presentation of the Williams Prize for 1948 to Mr. J. S. Bryan, A.M.I.C.E., for his Paper with Mr. J. B. R. Brooke, A.M.I.C.E., on "Gaseous and Liquid Fuels in Iron and Steel Works"; and presentation of the Ablett Prize for 1948 to Mr. G. S. Martin and Mr. M. Y. Harvey for their Paper on "The Maintenance of Electrical Machinery in Iron and Steel Works." Discussions on:—"The Conversion to Oil-firing of the Open-hearth Furnaces at Park Gate Works," by D. F. Marshall and H. C. White; "An Electrical Pressure Meter for Measurement of Open-hearth Furnace Differential Pressures," by S. S. Carlisle and B. O. Smith; and "First Report of the Gases and Non-metallics Subcommittee," by W. W. Stevenson, G. E. Speight, R. M. Cook and T. E. Rooney.

2.30 *to* 5.0 *p.m.—Afternoon Session:* Discussions on: "The Thermodynamics of Substances of Interest in Iron and Steel Making from 0 deg. C. to 2,400 deg. C.—I, Oxides," by F. D. Richardson and J. H. E. Jeffes; "Large Crystal Grain Size in Silicon-chromium Valve Steels," by C. C. Hodgson and H. G. Baron; "Grain Growth in Silicon-chromium Valve Steel," by H. Allsop and P. W. Bygate; and "The Structure of Carbides in Alloy Steel—Part I, General Survey," by H. J. Goldschmidt.

THURSDAY, APRIL 28, 1949

9.45 *a.m. to* 12.15 *p.m.—Morning Session*: Discussions on:—"The Charging of Open-hearth Furnaces by Present Methods," by E. L. Diamond and A. L. Frankau; "The Influence of Heat Transfer on Open-hearth Furnace Charging Rate," by M. W. Thring; "The Layout of Integrated Steelworks in Great Britain," by H. H. Mardon and J. S. Terrington; and "The Application of Dry Coke Cooling Plants to Integrated Iron and Steel Works," by L. H. W. Savage and A. V. Brancker.

(*Concluded at foot of column two.*)

12.45 *for* 1.15 *p.m.*—Members' Luncheon.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

MARCH 21.

Institution of Works Managers.

London Branch:—"The Factories Act," by T. H. Threlkeld, at the Waldorf Hotel, Aldwych, London, W.C.2, at 6.45 p.m.

The Physical Society.

The Guthrie Lecture: "Experimental Studies in Thermal Convection," by Professor A. O. Rankine, at the Royal Institution, 21, Albemarle Street, W.1, at 5 p.m.

Institution of Production Engineers.

North-Eastern Section:—"Noise and Vibration in Machinery," by Dr. W. A. Tuplin, M.I.Mech.E., at the Lecture Theatre, Neville Hall Mining Institution, Newcastle-upon-Tyne, at 6.30 p.m.

MARCH 23.

Belfast Association of Engineers.

"Aluminium Alloys as Engineering Materials," by J. C. Bailey, B.Sc. (Details to be obtained from the Secretary.)

Institute of British Foundrymen.

Birmingham Branch:—"Naturally-bonded *versus* Synthetic Sand," debate initiated by J. J. Sheehan and W. B. Parkes, at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 7 p.m.

Slough Section:—Afternoon visit to the Fulmer Research Institute, Stoke Poges, Bucks.

MARCH 24.

The Institute of Metals.

Birmingham Local Section:—Films on Steel-making and the Manufacture of Tungsten Carbide, at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 6.30 p.m.

MARCH 25.

Sheffield Local Section:—Annual General Meeting and Film Show at the Grand Hotel, Sheffield, at 6.30 p.m.

Institute of British Foundrymen

London Branch:—Men's Dinner at the Criterion Restaurant, Piccadilly Circus, London, W.1, at 7 p.m.

Institution of Mechanical Engineers

Annual General Meeting of Corporate Members at Storey's Gate, St. James's Park, London, S.W.1, at 6 p.m.

MARCH 26.

The Institute of British Foundrymen.

Bristol Branch:—"The Lost Wax Process," by D. B. F. Tedds, at Exeter.

East Midlands Branch:—Annual Meeting, followed by Short Paper Competition, at the School of Arts and Crafts, Derby, at 6 p.m.

Wales and Monmouthshire Branch:—Annual Meeting and visit of Mr. R. B. Templeton and Mr. T. Makemson to the Branch.

Burnley Section:—Annual Meeting, followed by Short Paper, "Non-ferrous Founding," by T. Freeman, at the Grammar School, Blackburn Road, Accrington, at 6.15 p.m.

Latest Foundry Statistics

The Bulletin of the British Iron and Steel Federation showed that the total working force of the ironfoundry industry had increased during the year ending December 4, 1948, from 141,991 to 150,987—a gain of over 6 per cent. In the case of the steel foundries, the increase was from 18,925 to 19,347, or 2.2 per cent. The production of steel for steel castings in December, 1948, was running at an average weekly output of 7,900 tons as against 7,100 tons in the corresponding month of last year. The November figure was 8,600 tons.

Institute of Vitreous Enamellers

Joint Meeting with the Ceramic Society

Last Thursday was held, at the Technical College, Stoke-on-Trent, the first joint meeting of the Institute of Vitreous Enamellers with the Pottery Section of the British Ceramic Society, Dr. H. W. Webb in the chair.

To a joint audience of about 120, the first Paper to be presented was that of Mr. S. H. Ryder, entitled "Ceramic Glazes—Some Points of Comparison with Vitreous Enamels." The Author gave an exhaustive survey of the conditions obtaining in the ceramic field which also entered into that of vitreous enamelling. In general, it was stated that enamelling technique was in advance of glazing in such matters as lead-free compositions, short-firing tendencies and in some methods of testing. On the other hand, the Author felt that ceramic glazes were applied in a state of much finer division than were enamels and this necessitated more care in preparation. Furthermore, it was stressed that, while vitreous enamels were bonded to an impermeable base, such as iron or steel, glazes were applied to a permeable clay, which was itself by no means inert. This latter point was taken up in the discussion which followed, it being felt by enamellers that the use of iron or steel as a base brought its own attendant difficulties. Other matters discussed were the use of suspending agents; continuous melting; mill linings; rubber mills; enamelling furnace atmospheres; and methods of frit firing.

The second Paper was that of Mr. A. Biddulph on "The Grinding and Preparation of Enamel Slips." In this exposition, the Author dealt first with raw materials and then with milling theory, stressing that the process was one of attrition and not impact. Optimum sizes for grinding media were quoted as consisting of varying proportions of 1-, 1½-, 2- and 2½-in. pebbles according to mill diameter, a 4-ft. mill taking 40 per cent. 1½-in., 40 per cent. 2-in., and 20 per cent. 2½-in., while a mill 12-in. dia. would take 80 per cent. 1-in. pebbles and 20 per cent. of the 2-in. size. The effect of proportions of materials in the mill, of temperature, mill speed and cleanliness, were next considered. Finally, mill-room layout, milling equipment and practice, and product testing were outlined, the Author concluding by stressing the importance of storing and ageing and quoting methods for increasing efficiency and economy in applying the enamel. The discussion of this Paper was somewhat curtailed due to programme requirements, but questions on mobility of "slip," on milling efficiency, as related to particle size, and on grinding media were competently answered.

Following an official joint luncheon at the North Stafford Hotel, Stoke-on-Trent, the assembly divided into parties for works visits, which concluded the day's events. Among the firms who opened their premises for inspection were Josiah Wedgewood, T. C. Wild & Company, Limited, Simplex Electric Company, Limited, Colclough Colours, Limited, W. T. Copeland & Sons, Limited, and Campbell Tile Company, Limited.

Publications Received

Wiggin Nickel Alloys.—The latest issue to be received deals with the extensive use of Monel metal in modern laundry equipment and in plant for the production of high quality starch for this industry. Monel in pickling plant equipment, electrodeposition processes and home bottling for fruit and vegetable preserves, is also described, as is the use of Inconel in new portable gas fires and case-hardening boxes for electrical and ancillary equipment in commercial vehicles. Of considerable interest is an article dealing with the many applications of bi-metals in automobiles.

Copper and Its Alloys in Engineering and Technology. Published by the Copper Development Association, Grand Buildings, Trafalgar Square, London, W.C.2. Gratis on application to Grand Buildings.

Though not specially addressed to foundrymen, this booklet does contain a wealth of information as to the properties of copper-base castings, including bearings. It is a particularly well-groomed booklet, neatness being its outstanding feature. The illustrations which are reproduced particularly well, have been well chosen.

The book is in nine sections, and describes in terms which the practical man can understand, the various grades of copper, the alloys of copper and other metals, the brasses, bronzes and gunmetals, and their electrical, mechanical and other properties. A useful series of tables classifies all these materials according to the type of service for which they are suitable. An appendix gives a simple explanation of the metallurgy of copper and its alloys, indicating the changes which can be effected by heat-treatment, and how to make use of equilibrium diagrams.

Colour Conscription. Published by British Paints, Limited, Portland Road, Newcastle-upon-Tyne, 2. Price 10s. 6d.

Colour printing is expensive and to present a brochure on the subject of colour it obviously means that a high cost is involved. That is why a charge has had to be made, but the publication is well worth the money. The reviewer has seen some of the early attempts at colouring factories and was frankly disappointed. He now confesses that he knew nothing of the basic principles of the subject and based his criticisms on but two factors: artistic appearance and the incidence of dust, which produced what is to him an anathema which he likes to express in the Yorkshire vernacular as "mucky finery." After studying this exceptionally well-produced brochure, new ideas have been received, they are not easy to put into words; that is why resort has been made to the use of coloured pictures. So good is this production, that the reviewer honestly believes that no more stimulating piece of trade literature has ever been made available. He most strongly counsels every executive reading this appreciation to procure for himself a copy. It will enable him to materialise some of his dreams, with the assurance that the innovations to be made are based on a sound foundation.

Steel Company of Wales

Progress at Trostre Works

The Steel Company of Wales, Limited, reports that its works now under construction at Trostre, near Llanelly, shows visible signs of progress in that concrete foundations and steelwork erection can now be seen above the level of the made-up ground. So far, 11,000 piles have been driven and 14,000 cu. yds. of concrete have been placed. The warehouse department will be the first building to be completed in order that its vast area can be used to store items of plant and machinery which will arrive from suppliers in Britain and the United States. The piling for this building is complete and the reinforced concrete floor is nearly finished. Steelwork erection has started, and it is hoped to complete the building by September 1 of this year.

In the pickling department the piling and concrete piers are sufficiently advanced to enable the reinforced concrete floor to be started. This building, 960 ft. long by 100 ft. wide, will eventually receive the coils of strip which will be produced at the Abbey Works. The excavation for the foundations of the five-stand cold-reduction mill is now completed; the rock underneath this mill has been levelled off to carry the concrete foundations. These foundations are now well in hand and the floor for the oil cellars and the electrical basement are in the course of construction.

Excavations have been completed for the cleaning lines, roll shop and machine shop, and piling is well in hand. The excavated material taken from this large area will form part of the fill which will eventually be extended around the building to form roadways, etc. The temper mills, like the five-stand cold-reduction mill, are founded on rock, and excavations are now in hand to expose the rock in this area.

In addition to the single railway track which has already been laid to link up with the main line, sidings have now been completed, and sufficient track has been laid to receive all the plant and materials delivered to the site by rail. This constitutes 15,000 ft. of track laid to date. The Old Morfa Works is now receiving small items of machinery for temporary storage. The bulk of the machinery so far has come from the United States, and further shipments are expected.

At present there are about 1,250 employed on construction, and arrangements are now being made to increase this number. A workmen's hostel is being built to accommodate 250 men, and has been arranged so that it can be extended as the need arises.

ADDRESSING STUDENTS at Glasgow Royal Technical College, on March 1, Sir Patrick Dollan, chairman of the East Kilbride Development Corporation, said that the new town would be the chief centre for research in Scotland when all the laboratories were in full swing and would be visited by experts from all parts of the world. There would be employment in the town for over 800 scientists, technicians and assistants, and this number would increase as buildings became available.

New Trade Marks

The following applications to register trade marks appear in the "Trade Marks Journal":—

"ANCALITE"—Metal wire (not insulated or fuse wire). BRITISH INSULATED CALLENDER'S CABLES, LIMITED, Norfolk House, Norfolk Street, London, W.C.2.

"AMBASSADOR"—Washing, wringing, juice-extracting machines, etc. R. N. FITTON, LIMITED, Radio Works, Hutchinson Lane, Brighouse, Yorks.

"FERRO-THERM"—Coated terne plates. AMERICAN FLANGE & MANUFACTURING COMPANY, INC., c/o Jensen & Son, 77, Chancery Lane, London, W.C.2.

"ROTODIP"—Machines for painting vehicle bodies by immersion. CARRIER ENGINEERING COMPANY, LIMITED, 24, Buckingham Gate, London, S.W.1.

"SARDIS"—Tinplates, blackplate, terne plate, etc. LLANELLY ASSOCIATED TINPLATES COMPANIES, LIMITED, Old Castle Works, Llanelly, Carmarthenshire.

"PERALTA"—Textile machinery and parts. ATELIERS H. DUESBERG-BOSSON SOCIETE ANONYME, c/o Urquhart-Dykes & Lord, 12, South Parade, Leeds, 1.

"DEUTZ" and "UNI DEUTZ"—Diesel engines (other than for land vehicles). PORN & DUNWOODY, LIMITED, Union Works, Bear Gardens, London, S.E.1.

"LITTLE GIANT"—Metal scaffolding and parts. LONDON & MIDLAND STEEL SCAFFOLDING COMPANY, LIMITED, Burwood House, Caxton Street, London, S.W.1.

"KINGLEY" (DEVICE)—Metal pipes and tubes, pipe joints and couplings. KINGS LANGLEY ENGINEERING COMPANY, LIMITED, Station Road, Kings Langley, Herts.

"DIZZY"—Unwrought and partly-wrought common metals, pipes, tubes, etc. WELL EQUIPMENT MANUFACTURING CORPORATION, c/o S. Matthews, 14-18, Holborn, London, E.C.1.

"ACLO SOUTHALL" (DEVICE)—Motor-driven land vehicles, internal combustion engines, etc. ASSOCIATED EQUIPMENT COMPANY, LIMITED, Windmill Lane, Southall, Middx.

"WORLDWIN"—Engine pistons, piston rings, piston-ring springs and cylinder liners for machines. WORLDWIN PRODUCTS, LIMITED, Treforest Trading Estate, Treforest, Glam.

"CARTER CLIMATIC CONTROL"—Internal combustion engine carburettors. CARTER CARBURETTOR CORPORATION, c/o Marks & Clerk, 57-8, Lincoln's Inn Fields, London, W.C.2.

"ALCOL"—Number plates for vehicles and metal non-mechanical and non-luminous signs. BROWN & ADAM (ENGINEERS), LIMITED, Renfield Works, Pollokshaws, Glasgow, S.3.

"FERROCARBO"—Silicon carbide in briquette or granular form for addition to steel and iron in the course of manufacture. CARBORUNDUM COMPANY, LIMITED, Trafford Park, Manchester, 17.

"WINDMILL" (DEVICE) and WINDMILL DEVICE—Measuring and weighing apparatus and instruments. PAYNE & GRIFFITHS, LIMITED, Tudor Works, Windmill Lane, Smethwick, Birmingham.

Trade Gap Narrows

The provisional figure for United Kingdom exports in February (£140.5 million) shows a drop of nearly £19 million from the high January figure. February contained only 24 working days and on a daily basis exports were 5 per cent. lower than in January, but 4 per cent. above the December rate.

Imports (provisionally) showed an even heavier reduction, from £187.2 million in January to £161.7 million, the lowest figure since the end of 1947. With re-exports at £4.4 million, the trade gap was only £16.8 million, compared with £22.9 million in January and £26.5 million in December.

MR. GEORGE MCLAREN, who celebrated his golden wedding recently, is a partner in the firm of Thomas McLaren & Sons, Limited, iron and brass founders, etc., of Galashiels.

Naval Work for Shipbuilders

Suggested Aid for Slack Periods

Speaking at the recent jubilee dinner of the North-East Coast Shiprepairers' Association, at Newcastle-upon-Tyne, Sir Cyril Hurcomb, chairman of the British Transport Commission, referred to the wartime needs of the Navy for auxiliary vessels, and suggested those requirements might be met by carrying as part of the Navy's equipment the specialist vessels required instead of requisitioning and adapting vessels of the merchant fleet. In addition, he asked, if we should again stand in danger of seeing our equipment and resources and skilled labour in the shipyards depleted through lack of work, was that not a possible direction in which some well-timed orders might help to preserve the desirable steadiness and balance in this vital industry.

Sir Cyril said that one-third of the tonnage completed last year was for export, and the North-East had turned out nearly 40 per cent. of the total. That was likely to be repeated in 1949. Tanker construction would no doubt increase, and the net addition to the dry cargo fleet, after allowing for ships going out of commission, should be well in excess of 200,000 tons.

Repair Work

Sir Lawrie Edwards, vice-president of the Shipbuilding Employers' Federation, said there had been a good deal of publicity about occasional British ships which were repaired abroad. That was because the North-East Coast area was well employed at present and was unable to take on work quickly because of the amount in hand. The number of ships sent abroad for repairs was infinitesimal compared with the amount of repair work which came from abroad to this country.

The North-East Coast, he said, was still far from being through the heavy load of work arising from the war, and there was much work for immediate attention. They nevertheless realised that in all probability this year would see the completion of the accumulation of wartime work, and that would mean there would be spare capacity in the yards. He hoped, however, Naval work would be placed in private yards to offset this possibility. Private yards had knowledge and skill now which, if not kept fully employed, might within a period of time be lost.

Lt.-Col. R. S. Chipchase, chairman and managing director of the Tyne Dock Engineering Company, Limited, South Shields, in welcoming the guests, said that the country could not afford to carry passengers in industry. It carried too many in non-productive civil administration. Concentration on essentials, with more national teamwork and less spirit of disgruntlement, was required. If more attention were paid by all to the vital needs of the country, to improved output and craftsmanship, and there were less attention to subsidised foreign propaganda, then Britain would soon regain her strength.

Private Enterprise in the Steel Industry

Mr. E. H. Lever Attacks Bill

The charge that private enterprise in the British iron and steel industry is incapable of handling the problems with which it is faced is emphatically refuted by Mr. E. H. Lever, chairman of the Steel Company of Wales, Limited, in his statement circulated with the first accounts of the company. "So many arguments for and against the Government's steel nationalisation measure have already been advanced that it is doubtful whether there is anything new to be said, but your directors feel that the origin and development of your company constitute a complete rebuttal of one of the main arguments of the supporters of the Bill, namely, that the complexity and magnitude of the developments with which the industry is faced are too great to be handled by private enterprise.

"The vast project of modernisation and expansion on which your company is engaged was conceived before the last world war was over; the technical details were worked out by the executives of the founder companies themselves; approximately £50,000,000 was raised to finance the project at a time when nationalisation had already cast its shadow, and very satisfactory progress has been made with the actual work of construction in spite of every kind of difficulty.

"These facts refute the charge that private enterprise in the British iron and steel industry is incapable of handling the problems with which it is faced. Your directors are against the Bill for many reasons. A Central Government Corporation could not deal with such a complex industry successfully."

Henry Meadows' Preference Dividend Guaranteed

The boards of Henry Meadows, Limited, and Associated British Engineering, Limited, have entered into an agreement whereby the latter company has undertaken to pay forthwith the 18 months of preference dividend on the Henry Meadows' preference shares at present outstanding up to February 28, 1949. In addition, Associated British Engineering has agreed to guarantee the payment of the preference dividend for a further period of 18 months up to and including the dividend due on September 1, 1950. In return for the payment and guarantee Henry Meadows, Limited, has granted A.B.E., Limited, options on the whole of its authorised, but unissued, share capital up to September 1, 1950.

Mr. Alan P. Good and Mr. Alexander Geddes, directors of A.B.E., Limited, and of the Brush group, have been co-opted to the board of Henry Meadows, Limited. Mr. Hamill, chairman of Henry Meadows, has joined the board of Associated British Oil Engines, Limited, which is one of the Brush group.

Company News

(Figures for previous year in brackets.)

QUALCAST—Interim dividend of 20% (same).

C. H. BAILEY—Interim dividend of 10% (7½%).

HOODS—Dividend of 10% and bonus of 7½% (same).

GENERAL REFRACTORIES—Dividend of 12½% (10%).

SAUNDERS VALVE COMPANY—Interim dividend of 6%.

BROWN BROS.—Final dividend of 15% (17½%), making 20% (same).

EVERED & COMPANY—Dividend of 20% (15% and jubilee bonus of 5%).

MILLOM & ASKAM HEMATITE IRON COMPANY—Dividend of 10% (same).

NEEPSEND STEEL & TOOL CORPORATION—Interim dividend of 15% (same).

LEHMANN, ARCHER & LANE—Final dividend of 60% (75%), making 100% (same).

EXPANDED METAL COMPANY—Final dividend of 15% (14½%), making 22½% (same).

SHEFFIELD FORGE & ROLLING MILLS COMPANY—Interim dividend of 5% (same).

CHINNOR CEMENT & LIME COMPANY—Final dividend of 11% (8%), making 15% (12%).

INGALL, PARSONS, CLIVE & COMPANY—Ordinary and deferred dividend of 10% (same).

MIDLAND ELECTRIC MANUFACTURING COMPANY—Dividend of 20% and cash bonus of 16% (same).

HAMMOND LANE FOUNDRY COMPANY—Final dividend of 9½% (7%, and bonus of 2½%), making 12½% (same).

ELECTRICAL COMPONENTS—Interim dividend of 5½% on account of the nine months ended March 31 (7½% for 12 months).

RATCLIFFS (GREAT BRIDGE)—Second interim dividend of 20%, making 35% (same). No final dividend in respect of 1948 will be proposed.

PRIMA INDUSTRIES—Dividend of 18%. (The company, which was registered in June, 1947, paid a dividend at the rate of 18% per annum for the period June 6-December 31, 1947).

STEETLEY COMPANY—Final dividend of 9% (6%) making 13% (10%). The directors state that new businesses are now in commercial production. Hence the ordinary dividend is restored to the pre-war level.

STEEL BARREL, SCAMMELLS & ASSOCIATED ENGINEERS—Final dividend of 9% and bonus of 5%, making 20% (same) for the year ended June 30, 1948; interim dividend of 5% for the current year (same).

A. H. HUNT—Final dividend of 15% for the period from December 21, 1947, to December 31, 1948, making 22½%. (The distribution for the period from June 20, 1947 (date of incorporation), to December 20, 1947, was 11¾%).

WOODHOUSE & RIXSON—Trading surplus for 1948, £74,385; other income, £528; to depreciation, £2,550; directors' emoluments, £12,854; tax, £31,225; leaving net surplus, £28,284; to dividend of 10d. per unit, £9,167 (same); forward, £51,983 (£32,865).

LOBNITZ & COMPANY—Profit for 1948, £88,389 (£70,663); net dividends after amount written off trade investment, £504 (£423); to depreciation, £8,000 (£5,000); audit, £133 (£77); directors' emoluments, £14,335 (£15,478); taxation, £45,000 (£30,064); net profit, £21,425 (£20,467); dividend of 8% (same); forward, £33,675 (£23,112).

D. NAPIER & SON—Trading profit to December 25, 1948, £242,783 (£250,135); to depreciation of fixed assets (other than land), £95,893 (£102,736); leaving £146,890 (£147,399); to profits tax, £29,000 (£37,000); income tax, £63,000 (£90,000); to reserve, £1,000 (from reserve £27,000); net profit, £53,890 (£47,399); to dividend of 7½% (same); forward. £260,164 (£249,179).

FESCOL—Trading profit for 1948, £35,085 (£24,980); interest, £1,359 (£1,121); to depreciation, £6,530 (£5,867); directors' remuneration, £3,866 (£3,950); taxation, £12,495 (£7,036); net profit, £13,553 (£9,248); to preference dividend, £2,117 net; ordinary dividend of 50% and bonus of 25%, £2,061 net; to general reserve, nil (£220); forward, £28,372 (£18,997).

JOHN BAKER & BESSEMER—Interim dividend of 30% (15%). The directors state that it is not possible for the accounts to be completed in the form set out by the Companies Act, 1948, in time to hold the annual meeting before April 5. It is therefore necessary to postpone the meeting, but it is honed to present the accounts by the end of April.

WESTWOOD, DAWES & COMPANY—Trading profit for 1948, £44,610 (£38,670); other income, £171 (£97); to depreciation, £3,144 (£3,213); directors' emoluments, £9,531 (£8,618); audit fee, £150 (same); profits tax, £4,750 (£4,250); income tax, £12,500 (£9,750); net profit, £14,706 (£12,786); to general reserve, £5,000 (same); dividend of 20% (same); forward, £14,194 (£9,988).

MARCONI'S WIRELESS TELEGRAPH COMPANY—Consolidated trading profit to December 35, 1948, £246,087; to depreciation, £50,848; leaving £195,239; dividends and interest (less tax, £43,750), £53,482; to depreciation equalisation reserve, £3,683; directors' fees, £3,900; taxation, £105,766; leaving £135,372; to dividends declared and proposed by parent company, £87,400; forward, £475,149 (£427,177).

PLATERS & STAMPERS—Consolidated net profit for 1948, after £108,806 (£83,690) for taxes, £106,848 (£76,767); profit retained by subsidiary, £1,740 (£2,054); net profit of parent company, £105,108 (£74,713); brought in, £229,365, plus £10,503 tax over-provided; final dividend of 22½%, making 35% (nil); forward, £300,102, of which £5,176 is retained by subsidiary. The company was made public in January, 1948.

GASCOIGNES (READING)—Consolidated trading profit to October 31, 1948, £62,301 (£44,042); trade investments, £899 (same); Government securities income, £140 (£170); to directors' remuneration, £13,495 (£10,684); depreciation of fixed assets, £4,482 (£3,635); leaving £45,363 (£30,792); to dividends, £13,750 (£11,000); tax, £25,996 (£17,450); staff provident reserve, £500 (same); forward, £25,487 (£20,370)

BEANS INDUSTRIES—Trading balance to November 30, 1948, £157,872 (£109,635); interest, £438 (£703); to depreciation, £32,194 (£20,685); directors' remuneration, £19,545 (£15,570); audit, £620 (£520); tax, £62,000 (£36,500); leaving, £43,651 (£37,063); reserve not required, £20,000 (nil); to staff pensions, £5,000 (nil); stock reserve, £20,000 (nil); general reserve, £10,000 (same); dividend of 37½% (same); forward, £45,406 (£40,405).

THOMAS ROBINSON & SON—Profit on trading for 1948, £103,494; to depreciation of fixed assets, £13,007 (£14,684); interest, £6,630 (£2,637); net income-tax charge on profits and investment income, £26,554; less Australian tax credit, £1,560; profits tax, £11,297 (taxes £20,000); directors' fees, £1,400 (same); management, £14,773 (not stated); preference dividend, £6,188; final ordinary dividend of 5%, making 7½% (same); forward, £68,223 (£53,331).

LONDON ALUMINIUM COMPANY—Trading profit in 1948, £303,045 (£340,495); sundry revenue, £305,739 (£342,621); to directors' fees, £850 (same); managing and works directors' remuneration, £4,900 (£15,751); auditors' fees, £1,050 (same); depreciation, £26,914 (£27,595); leaving, £272,025 (£297,375); available, £291,567 (£300,116); to tax, £165,856 (£173,666); written off goodwill, nil (£8,027); off share issue expenses, nil (£3,319); final dividend of 70% (75%), making 100% (same); forward, £30,149 (£19,542).

PADLEY & VENABLES—Consolidated trading profit for 1948, £92,010 (£74,368); to depreciation, £12,706 (£11,607); directors' emoluments, £9,477 (£7,958); audit, £285 (same); costs of conversion to public company, nil (£923); tax, £40.859 (£32,969); group net profit. £28,683 (£20,626), to profits retained by subsidiary, £12,232 (£3,916); parent company's net profit, £16,451 (£16,710); brought in by parent company, £39,554 (£39,151); to general reserve, £5,000 (£6,204); dividend of 100% (same); forward. £40,902.

H. & J. HILL (WILLENHALL)—Trading profit for 1948, £32,505 (£27,038); other income, £35 (same); to depreciation, £736 (£771); audit fee, £125 (same); directors' remuneration, £2,470 (£1,825); income tax, £8,948 (£3,786); profits tax, £5,000 (£4,500); net profit, £15,261 (£16,066); (E.P.T. repayable, £59 (nil); profits tax over-reserved, £49 (E.P.T., £412); brought in, £2,806 (£1,434); available, £18,175 (£17,912); to general reserve, £1,000 (£1,500); off goodwill, £2,499 (£2,500); future tax, £6.000 (£3.500); final dividend of 35%, making 50% (same); forward, £1,370.

RIVET, BOLT & NUT COMPANY—Trading profit for 1948, £255,000 (£264,707); adjustment on stock revaluation, £31,875 (nil); investment income, £26,048 (£23,484); to auditors' fees and expenses, £537 (£435); depreciation, £51,625 (£51,789); directors' emoluments, £14,437 (£14,216); taxation, £142,385 (£126,993); net profit, £103,939 (£94,758); to employees' benefit reserve, £10,000 (same); general reserve, £10,000 (same); dividend equalisation fund, £10,000 (£39,000); plant replacement and development reserve, £30,000 (nil); dividend of 15% (same); forward, £14,421 (£13,021).

SMALL & PARKES—Trading profit to November 30, 1948, £255,041 (£244,596); other income, £779 (£462); to directors' emoluments, £30,342 (£29,832); depreciation, £21,329 (£18,537); income tax, £80,200 (£75,600); E.P.T. and profits tax, £28,500

(£32,600); net profit, £95,449 (£88,488); to general reserve, £25,000 (£30,000); stock depreciation, £25,000 (£9,000); benevolent fund, £1,000 (same); deferred repairs and re-equipment, £22,479 (nil); past service pensions, nil (£9,948); final dividend of 10%, making 20% (same), and bonus of 10% (same); forward, £41,755 (£40,945).

TAYLOR TUNNICLIFF (ELECTRICAL INDUSTRIES)—Consolidated trading profit for 1948, £280,556 (£283,534); investment income, £551 (£414); tax reserve interest, £51 (£400); rents, £188 (£164); to directors' remuneration, £18,804 (£16,839); auditors' remuneration, £540 (£500); depreciation, £29,300 (£24,708); tax, £144,320 (£150,779); parent's administration expenses, £319 (£303); applicable to outside interests, £2,938 (£3,164); leaving £85,125 (£88,219); ordinary dividend, £24,750 (same); written off goodwill, £15,000 (nil); forward, £189,924 (£150,599, after £1,949 applicable to outside interests for 1946).

ENGLISH ELECTRIC COMPANY—Consolidated trading profit to December 25, 1948, £1,960,966; to depreciation, £554,009; dividends and interest, less income tax, £34,167; profit on sale of trade investment, £23,578; provision no longer required, £31,935; interest on 4% debenture, £39,753; to contingencies, £82,152; depreciation equalisation, £28,683; profits tax, £234,547; liability for current income-tax year, £208,256; future liability for income tax, £286,230; to minority holders, £21,048; applicable to group, £595,968; to dividends, less tax (interim of 4% and final of 6%), by parent company, £266,174; to general reserve, £200,000; forward, £444,106.

MARCONI INTERNATIONAL MARINE COMMUNICATION COMPANY—Consolidated accounts for 1948 show rentals, maintenance, ships telegrams, profit on sales and sundry receipts, £1,032,214; dividends on trade investments, £25,007 (including £22,342 in respect of previous years); to administrative salaries, £112,236; general charges, £54,718; directors' fees, £3,500; auditors, £1,300; expenses of ship stations, etc., £561,084; depreciation, £173,556; depreciation equalisation reserve, £37,500; total taxation, £55,000; net profit, £58,327 (£50,010 after tax and £136,141 for depreciation); final dividend of 5%, making 7½% (same); forward, £45,518 (£36,391).

RADIATION—Consolidated trading profit for 1948 except one overseas subsidiary covering the year to August 31, £1,010,461 (£825,925); investment income, £49,902 (£61,323); other income, £3,092 (£4,203); to depreciation, £120,143 (£106,337); directors' remuneration, £63,976 (£65,291); audit expenses, £4,726 (£4,289); pensions, £30,211 (£2,819); pensions reserves, nil (£26,819); tax, £460,076 (£347,221); proportion attributable to minority shareholder in overseas company, £1,329 (£450); net group profit, £382,931 (£314,644); brought in, £829,335 (£706,130); available, £1,212,266 (£1,020,774); to stock obsolescence reserve, £110,000 (nil); final dividend of 7½%, making 12½% (same); forward, £910,827.

BRUCE PEEBLES & COMPANY—Profit on trading for 1948, £180,700 (£130,483); to depreciation on buildings, £3,000 (same); machinery and plant, nil (directors consider present provision to be adequate) (against £17,000); interest and dividends, £6,222 (£3,756); leaving £183,922 (£114,239); to income tax, £84,000 (£52,000); profits tax, £26,000 (£16,000); net profit, £73,922 (£44,239); brought in, £24,747 (£18,095); tax provision not now required, £10,000 (£35,000); available, £108,669 (£97,334); to fixed assets replacement, £25,000 (nil); contracts reserve, £45,000 (nil); dividend equalisation, £15,000 (nil); general reserve, nil (£25,000); research and development, nil (£35,000); dividend of 10% (same); forward, £11,082.

WESTINGHOUSE BRAKE & SIGNAL COMPANY—Consolidated trading profit and sundry income for 53 weeks to October 2, 1948, £586,866 (£441,077 for 52 weeks); trade investments, £1,417 (£873); investment income £444 (£1,951); E.P.T. reduction, nil (£25,500); to depreciation, etc., £98,864 (£83,956); directors' fees, £3,764 (£3,809); directors' other emoluments, £9,600 (£18,905); directors' pensions, £8,898 (£4,750)); bank overdraft interest, £11,769 (nil); tax, £209,123 (£170,926); attributable to minority shareholders, £15,830 (£10,799); attributable to shareholders in holding company, £230,879 (£176,256); profits retained by subsidiaries, £68,139 (£20,346); net profit of parent company, £162,740 (£155,910); income for previous years and provisions no longer required, £7,417 (nil); to replacement of plant and equipment reserve, £55,000 (nil); general reserve, nil (£50,000); contingencies reserve, £23,311 (nil); staff pensions reserve, nil (£5,000); dividend of 14% (same); forward, £99,103 (£93,680).

Parliamentary

Shipbuilding Industry's Steel Supplies

COL. JAMES HUTCHISON asked the Parliamentary Secretary to the Admiralty when he expected to increase the allocation of steel to the shipbuilding industry, and whether he was aware that orders for foreign vessels were being lost because British yards could not give sufficiently early dates of delivery.

MR. JOHN EDWARDS (Civil Lord), in reply, said: The first part of the question is for the Secretary of the Treasury. The answer to the second part of the question is "No, sir." I am not aware of the loss or cancellation of any orders for merchant ships whose construction in British yards has been licensed.

COL. HUTCHISON: Is the Minister aware that in fact orders are being lost and that the shipbuilding industry is working at only half its potential capacity, and that with a better allocation of steel the time of delivery could be shortened and costs reduced?

MR. EDWARDS said that he was prepared to accept Col. Hutchison's word concerning his own experiences in regard to shipbuilding, but pointed out that the industry, in common with others in the country, had to be "a little short of steel because of the shortage of it." He added: "The shipbuilding industry is not doing so badly because it is getting above its allocation."

Management Training in Technical Colleges

SIR P. HANNON asked the Minister of Education if he had now considered proposals for the extension of training in management in technical colleges and schools with special reference to the engineering industry, and if training, with this object in view, would be encouraged in the technical departments of secondary schools.

MR. TOMLINSON: Yes, sir. A scheme for the issue of certificates and diplomas in management studies has been drawn up by my department in co-operation with the British Institute of Management. The scheme closely follows the recommendations of the Urwick Committee, and I hope that it will be acceptable to the engineering industry. I do not think specific training for management would be appropriate in the curricula of secondary schools.

Government's Powers Under New Patents Bill

The text of the Patents and Designs Bill was published on March 9. The main object of the Bill is to provide remedies for the abuse of patent rights or insufficient use of patented inventions. Existing provisions to grant compulsory licences to work an inadequately utilised invention are proposed to be extended considerably, especially to cover cases where the invention is not worked to the fullest possible extent, or where the export market is not being supplied.

The Bill empowers the Government to take action in cases reported on by the Monopolies and Restrictive Practices Commission.

Obituary

MR. JOHN DENTON, governing director of Niagra Forge (Sheffield), Limited, has died at the age of 74.

MR. GEORGE B. HENDRY, a director of Hendry & Sons, ironfounders, of Shettleston, Glasgow, E.2, died on February 23.

MR. ALEXANDER WEIR ANDERSON, a partner in James Jenkins & Son, iron and steel merchants, etc., of Glasgow, died on March 4.

MR. ALFRED WILLIAM WILLS, who has died at the age of 77, was a director of the Horstmann Gear Company, Limited, Bath.

MR. RANKIN WRIGHT, who was for many years in business with his father as a brassfounder at Wolverhampton, has died at the age of 80.

MR. C. E. HODGKIN, chairman of the Pulsometer Engineering Company, Limited, Reading, died at his home at Pangbourne, near Reading, on March 3. He was in his 90th year.

MR. ALBERT WARD, who died suddenly in hospital on March 5, was associated with the Manchester branch of Eadie Bros. & Company, Limited, ring manufacturers, for 40 years. He was 53.

MR. EDWARD SMALLEY, deputy chairman and joint managing director of Tweedales & Smalley (1920), Limited, textile machinists, of Rochdale, died on March 6. Mr. Smalley, who was 69, was the second son of the late Mr. Joseph Smalley, one of the founders of the firm, and had been connected with the company for 53 years.

MR. J. H. G. MONYPENNY, originator of the research department of Brown Bayley's Steel Works, Limited, Sheffield, died recently at the age of 63. He had charge of the company's research department for 25 years, later becoming the firm's technical representative. He retired in 1945. Mr. Monypenny, who wrote the first book on stainless steel to be published in this country in 1926, was a past-chairman of the British Chemical Plant Manufacturers' Association and a fellow of the Institute of Physics.

SIR ARCHIBALD PAGE, formerly chief engineer and later chairman of the Central Electricity Board, died at his home at Sanderstead, Surrey, on March 7, at the age of 73. During his period of office he was responsible for the building of the great grid system, costing some £40 million, with a network of high-tension lines of a total length of 4,000 miles all over the country, stretching from the Grampians to Land's End. Sir Archibald was appointed chairman of the Board, in succession to Sir Andrew Duncan, in 1935, and retired at the end of July, 1944, for reasons of health. He served as president of the Institution of Electrical Engineers in 1927-28, and received a knighthood in 1930.

AN EXTRA-ORDINARY MEETING of Geevor Tin Mines, Limited, will be held at 208-224, Salisbury House, London, E.C., on March 29, for the purpose of considering new articles of association.

Steel Output's New All-time Record

Scrap Drive's Progress

Favourable weather in February was a major factor in the operations at British steelworks, which set up a new all-time output record with an annual rate of production of 16,176,000 tons. The month of February is not a holiday period, but it is often adversely affected by the weather, which this year, however, was particularly good. The best previous month was November of last year, when the annual rate of steel production was 15,760,000 tons. The steel industry has thus made a fine start to the year, for in the first month of 1949 output, at an annual rate of 15,002,000 tons, was the highest ever achieved in the month of January.

Pig-iron output in February was at the rate of 9,422,000 tons a year, compared with 9,169,000 tons annually in February, 1948.

In announcing the latest production figures, the British Iron and Steel Federation states that the home scrap drive is still going very well, and scrap supplies are being maintained well above normal expectations. The flow of imported scrap has also considerably improved.

Latest steel and pig-iron output figures (in tons) compare as follow with earlier returns:—

	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1949—January ..	178,100	9,262,000	288,500	15,002,000
February ..	181,200	9,422,000	311,100	16,176,000
1948—January ..	167,800	8,726,000	280,600	14,589,000
February ..	176,300	9,169,000	289,400	15,049,000

Contracts Open

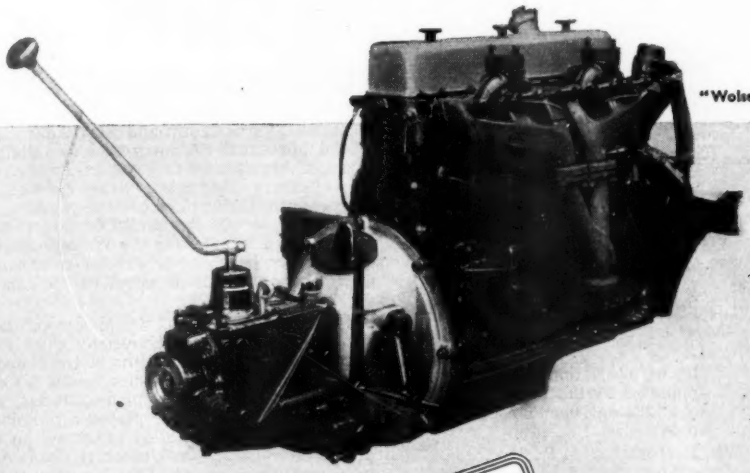
The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference E.P.D. or C.R.E. can be obtained from the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, London, S.W.1.

BALLYMENA, March 28—Supply of spun-iron water mains and special castings of various sizes, for the Mid-Antrim Waterworks Joint Board. Ferguson & McIlveen, civil engineers, 6, University Square, Belfast.

BRISBANE, April 22—Supply of approx. 220,000 ft. of 4-in. nominal dia. centrifugally cast-iron water pipes, for the City Council. The Agent-General for Queensland, Queensland Government Offices, 409-413, Strand, London, W.C.2.

CORK, March 31—Supply of 60 ½-in. and 36 1-in. cold water meters for connections for lead piping, for the Town Council Mr. P. Monahan, town clerk, City Hall, Cork.

GLANFORD BRIGG—Contract No. (1) Supplying and laying about 18 miles of 7-in., 6-in., 4-in. and 3-in. dia. spun-iron mains; (2) supplying and laying about 6 miles of 4-in. and 3-in. dia. spun-iron mains, for the Rural District Council. Mr. J. H. Haiste, 4, Queen Square, Woodhouse Lane, Leeds, 2. (Deposit £3 3s. each contract.)



"Wolseley 14 h.p. Engine."

A NUFFIELD PRODUCT

Using

STANTON-DALE

REFINED PIG IRON

USED AND RECOMMENDED
FOR ALL HIGH-DUTY
ENGINEERING CASTINGS

THE STANTON IRONWORKS COMPANY LIMITED, Nr. NOTTINGHAM

Personal

MR. C. A. KLEIN has retired from the board of Goodlass Wall & Lead Industries, Limited, Oxted, Surrey.

MR. J. G. FINLAY has resigned from the board of the Union Steel Corporation (of South Africa), Limited.

MAJOR F. W. SMITH has been appointed a director of Webley & Scott, Limited, engineers and machinists, of Birmingham.

MR. E. H. KING has been appointed to the board of Ingall, Parsons, Clive & Company, Limited, brassfounders, etc., of Birmingham.

DR. F. MEYER, chairman of the South African Iron & Steel Industrial Corporation, Limited, has been appointed chairman of African Metals Corporation, Limited.

MR. GEORGE LYNCH, bolt forger of the Rivet, Bolt & Nut Company, Limited, Glasgow, has been appointed president of the Executive Council of the Iron and Steel Trades Confederation. He is 39.

MR. H. BENDING, secretary of the National Union of Scale Makers, has been appointed by the President of the Board of Trade as an additional member of the Committee on Weights and Measures Legislation.

WING.-COMMANDER N. J. HULBERT, M.P., has been appointed a director of the Metropolitan-Vickers Electrical Export Company, Limited. He is chairman of British Steel Constructions (Birmingham), Limited.

MR. GEORGE GUMMER, chairman and managing director of Gummers, Limited, valve manufacturers, etc., of Rotherham, has been elected for a third year as president of the Northern Employers' Brassfounders' Association.

SIR ROBERT SINCLAIR, deputy president, was nominated president of the Federation of British Industries at a meeting of the Grand Council last week. He is chairman of the Imperial Tobacco Company, Limited.

COL. N. GELDARD, who has been with John Fowler & Company (Leeds), Limited, manufacturers of agricultural machinery, locomotives, etc., for 30 years, has been chosen as Conservative candidate for the Ilkley Division at the West Riding County Council elections.

MR. GEOFFREY W. GOODWIN has been appointed finance director of Jonas & Colver (Novo), Limited, steelmakers, of Sheffield. Other appointments to the board are:—MR. COLIN CAVILL (commercial director) and MR. JOHN HATTERSLEY. All have been connected with the company for over 20 years.

MR. H. W. WINHAM, assistant manager of Armstrong Whitworth & Company (Pneumatic Tools), Limited, Gateshead-on-Tyne, for some time past, has been appointed to succeed the late Mr. Ernest Lyall as manager, while MR. H. H. E. GEORGEL has been appointed sales manager of the company.

MR. JOHN GLOAG and MR. H. V. LOBB have been appointed by the President of the Board of Trade to be members of the Council of Industrial Design. The President has also reappointed MR. LESLIE GAMAGE, MR. E. W. GOODALE and MR. P. G. R. WHALLEY to be members of the Council on the termination of their existing appointments.

MR. THOMAS M. GRANT, a director of Raine & Company, Limited, iron and steel manufacturers, of Newcastle-upon-Tyne, and Vice-Consul Gerente at Newcastle-upon-Tyne, has been awarded the Knighthood of the Order of Christ by the President of Portugal, for services to the Portuguese mercantile marine.

SIR LLEWELLYN SOULSBY and SIR LEIGHTON SEAGER have been appointed chairman and vice-chairman respectively of Mounstuart Dry Docks, Limited, Cardiff, and its subsidiary companies. From 1939 to 1947 Sir Llewellyn was managing director of the undertaking, and during the war he was Regional Director of Merchant Shipbuilding and Repairs for the Western Region. Sir Leighton Seager has been a director of the company for many years and was president of the Chamber of Shipping in 1944.

PROF. LESLIE AITCHISON, Professor of Industrial Metallurgy at Birmingham University since 1946, has resigned owing to ill-health. For 20 years from 1924 he was superintendent with James Booth & Company, Limited, non-ferrous metal manufacturers, etc., of Nechells, Birmingham, and he played a prominent part in the growth of the light alloy industry. In addition to his work at Birmingham University, Prof. Aitchison was, until recently, chairman of the Inter-Services Metallurgical Research Council, chairman of the Joint Committee on Metallurgical Education and a member of the Council of both the Royal Aeronautical Society and the Institute of Metals.

Wills

PATERSON, SIR C. C., director of the research laboratories of the General Electric Company, Limited, since 1919 ... £41,586

ROBINSON, S. H., partner in the firm of Arthur Robinson, manufacturers of drop forgings and stampings, of Willenhall ... £23,832

BEDFORD, R. A., chairman and managing director of John Bedford & Sons, Limited, steel and tool manufacturers, of Sheffield ... £65,909

WRAGG, JOSEPH, late chairman of Thomas Wragg & Sons (Sheffield), Limited, fireclay miners and manufacturers of refractory goods ... £97,194

WOOD, A. E., chairman and managing director of Hutchinson, Hollingworth & Company, Limited, textile engineers, ironfounders, etc., of Saddleworth, Yorks ... £101,346

MERZ, NORBERT, late chairman of A. Reyrolle & Company, Limited, manufacturing electrical engineers, etc., of Hebburn, and a director of the Thermal Syndicate, Limited, Wallsend, and other companies ... £82,325

LITHGOW HENRY, chairman of James Dunlop & Company, Limited, Glasgow, and a director of Lithgows, Limited, shipbuilders, of Port Glasgow, Fairfield Shipbuilding & Engineering Company, Limited, Govan, Gourock Ropework Company, Limited, Port Glasgow, William Beardmore & Company, Limited, Glasgow, and other companies ... £1,972,784

THE MINISTER OF FOOD announces that the price of sperm oil has been reduced from £102 to £60 per ton. The revised price came into force on March 6.

The Mulbaro

The *portable* mullor

THIS all-purpose mullor fulfils the specific mulling needs of all types of foundries. It consists of a detachable mulling unit mounted on a wheelbarrow. Power-driven rubber-tyred mullors mix, mull, and aerate the sand thoroughly; then the wheelbarrow is used to take the mulled sand where required.

Write for Folder F138

Made under licence from The Beardsley & Piper Co. Chicago, by

HERBERT MORRIS LTD

Loughborough England

News in Brief

BIRMID INDUSTRIES, LIMITED, Smethwick, has agreed to a policy of limitation of dividend distribution during the next 12 months.

WELLINGTON TUBE WORKS, LIMITED, Tipton, Staffs, has opened a London office at 36, Victoria Street, S.W.1 (telephone: Abbey 1326-7).

NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED, Glasgow, has received an order for 18 engines, valued at £360,000, for the Egyptian State Railways.

A CARGO OF SCRAP METAL brought to Blyth from Germany in the steamer Banka was the first cargo of this kind to reach the port in about 30 years.

THE MILLOM & ASKAM HEMATITE IRON COMPANY, LIMITED, is to carry out boring operations for iron ore between Lamplugh and Cockermouth, near Dean.

THE THREE-STOREY FACTORY of Metal Rubber Products, Limited, at Long Eaton, Derbyshire, was gutted by fire recently. Damage is estimated at between £30,000 and £40,000.

THE HEAD OFFICES of the Mond Nickel Company, Limited, are being moved on March 28 from Grosvenor House, Park Lane, to Sunderland House, Curzon Street, London, W.1 (telephone: Grosvenor 4131).

A PATTERNSHOP WORKER at Newton Chambers & Company, Limited, Thorncliffe, near Sheffield, Mr. John Windle, retired recently after 43 years' service, thus closing 154 years' continuity of service with the firm by four generations of the family.

MR. ROBERT ALFRED WORKMAN, a director of the Fairfield Shipbuilding & Engineering Company, Limited, Glasgow, William Doxford & Sons, Limited, Sunderland, and several other shipbuilding companies, who died intestate on April 27, 1948, aged 75, left £23,725 gross.

ASSOCIATED BRITISH OIL ENGINES, LIMITED, has received an order from the States of Guernsey Electricity Department for a Mirrlees "HFAS8," 8-cylinder, turbocharged, Diesel engine, to be installed in St. Sampson's power station, which will replace a Mirrlees 200-kw. set built in 1915 and which is now becoming obsolescent.

MR. WILLIAM SCOTT, managing director of Jarrow Metal Industries, Limited, and its associated companies, on his return home after a visit to South Africa, stated that tremendous iron and steel developments were taking place there and, as the Dominion had to cut down on dollar imports, there was a chance for British products to establish themselves.

A MEMORIAL PLAQUE to Sir Robert Hadfield, the Sheffield metallurgist who played an important part in the development of alloy steels, is to be placed on the house where he was born. The plaque has been commissioned jointly by the Sheffield Metallurgical Society, the Sheffield Society of Engineers and Metallurgists, and the Iron and Steel Institute.

REPRESENTATIONS ARE BEING MADE at a national level against plans by British Railways to build foundries at Horwich, Manchester, for making railway chairs, sole plates, and brake blocks. Companies which have protested claim that the plans will result in loss of work for private firms manufacturing these articles, which might mean the displacement of 2,000 men and boys.

ALL ALUMINIUM CONTAINERS and the manufacture, marking and use of all-metal containers of 1 Imperial gall. and more are decontrolled by a Board of Trade Order which came into effect on Friday. The Order also makes relaxations of the marking restrictions on metal containers, including closures. The Order is the Control of Containers and Packaging (No. 5) Order.

THE TRUSTEES OF the Dorman, Long-Laurence Ennis Memorial Scholarship Fund have awarded the two 1948 scholarships to Mr. Wilfrid Sumner and Mr. Alan Rayfield Feaver, both of Redcar. The award will enable Mr. Sumner to spend six months with leading British electrical companies and Mr. Feaver will visit a number of leading engineering plant manufacturers in this country.

AT THE INQUEST on three men who lost their lives in an explosion on December 18 at the works of Jas. Ogden & Sons, spindle and flyer manufacturers, of Halifax, the jury returned a verdict of "death from misadventure," and said it wished to add "that Home Office regulations regarding these plants should be amended." Mr. W. E. Ogden, the proprietor, lost his life in the explosion, which occurred in an acetylene cylinder and was caused by a backfire.

A COMPLIMENTARY DINNER, given by the staff of Mitchell, Russell & Company, Limited, ironfounders, etc., of Bonnybridge, Stirlingshire, to the directors on the occasion of the 20th anniversary of the company's incorporation, was held at Falkirk on March 1. Mr. J. Liddell presided over a company of nearly 100, which included Mr. James Mitchell, chairman and managing director, Mr. T. B. Preston, joint managing director, and other members of the board.

North British Locomotive's Training Scheme

An ambitious training scheme for apprentices, which aims at a steady flow of new recruits into the industry, has been started by the North British Locomotive Company, Limited, at its Springburn (Glasgow) works. Under the scheme, boys are being recruited at the age of 15 and have to undergo an entry examination. If selected, they are brought into the company's works and offices for nine months' employment.

At 16, when ready to be indentured as apprentices, the recruits are to be drafted into departments equipped with special machinery. After six months, the apprentices will be placed in various departments, spending two years moving from one branch to another, irrespective of the trade they intend to follow. For the remaining three years of his apprenticeship, the apprentice settles in the department in which he will finally be employed.

NEW

CHELFORD
Processed Washed Sand

A modern plant has been installed for the washing and grading of Chelford Sand. This plant is of the latest and most efficient type and Chelford Processed Sand can now be supplied thoroughly washed and in two grades, coarse and fine. The chief features are as follows :—

COARSE GRADE

Grading mainly between 30 and 85 mesh B.S.S. and practically free from fines below 85.

Uniform grading gives closer control of mixtures.

Increased permeability.

Negligible clay content.

Superior to natural sand for special purposes e.g. synthetic moulding mixtures, cement moulding process, etc.

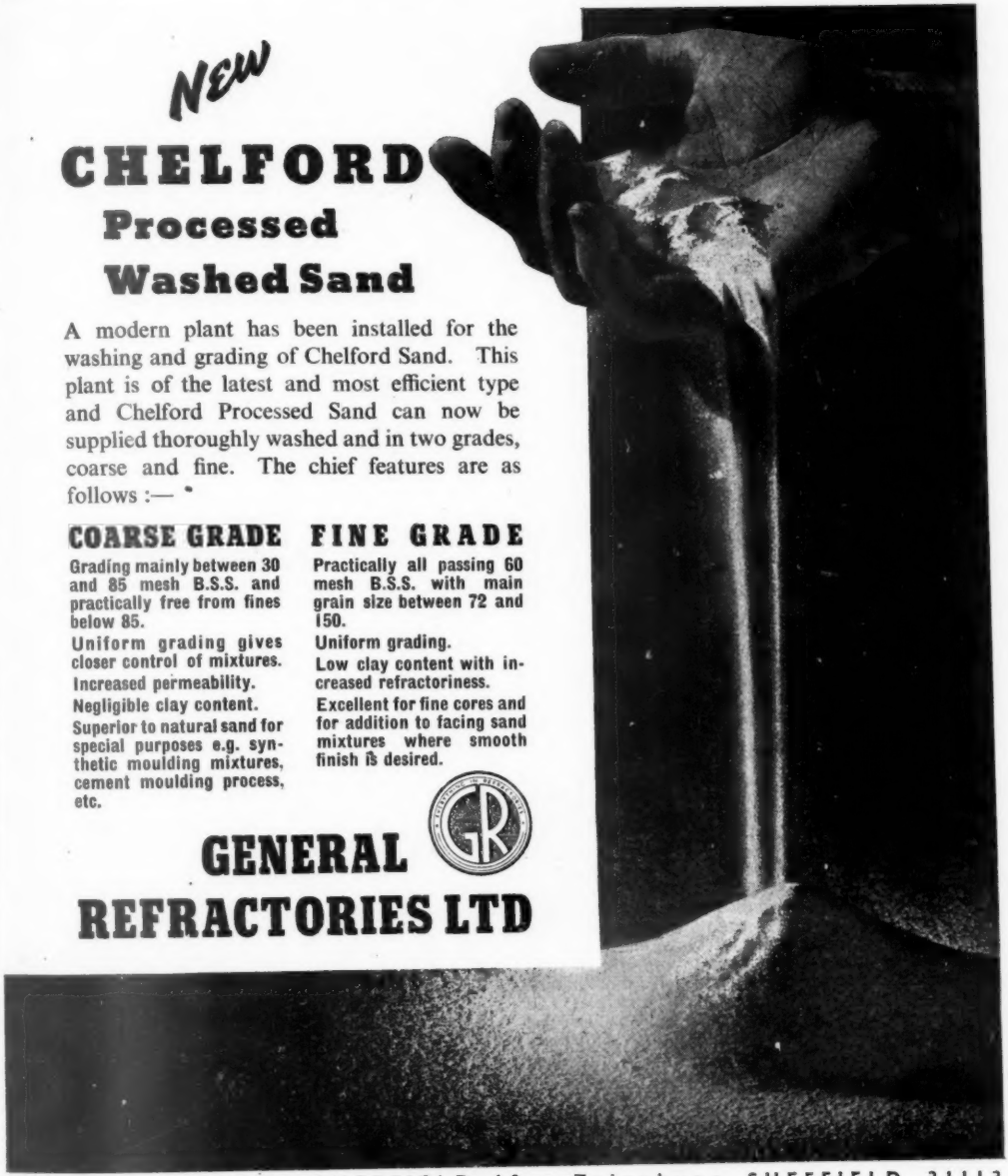
FINE GRADE

Practically all passing 60 mesh B.S.S. with main grain size between 72 and 150.

Uniform grading.

Low clay content with increased refractoriness.

Excellent for fine cores and for addition to facing sand mixtures where smooth finish is desired.



GENERAL REFRACTORIES LTD

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208

Raw Material Markets

Iron and Steel

Foundries generally are receiving adequate supplies of coke, ganister and limestone, while deliveries of firebricks are showing improvement. There is, however, no change in the pig-iron situation, the demand for which continues to be greater than current production. The light foundries are fully employed and are constantly pressing for increased quantities of high-phosphorus pig-iron, but production of this grade is insufficient to satisfy their needs. As a substitute, some foundries are trying to incorporate refined grades of pig-iron in their mixtures, with varying degrees of success, depending on the type of castings required.

The output of low- and medium-phosphorus pig-irons and hematite for the engineering, speciality and jobbing foundries is fully absorbed and additional tonnages of refined grades are being used for the production of engineering and machinery castings. Supplies of ferro-alloys are readily obtainable. Increased quantities of suitable cupola sc ap, both cast and steel, are needed in some areas.

All available supplies of semis are disposed of readily, but the re-rollers are finding these inadequate to enable them to fulfil their heavy commitments satisfactorily. This applies particularly to small bars, light sections and narrow strip, for which the mills are inundated with orders. The tonnages from the Continent are insufficient to balance the shortages from home works. There is also an excessive demand for sheets which cannot be satisfied because of the shortage of sheet bars. The mills rolling the larger sizes continue to receive fairly satisfactory deliveries and are much better off for supplies of steel than the light re-rollers. All arisings of defective billets, sheets, bars, and crops are readily accepted.

Non-ferrous Metals

Last week saw the beginning of the long-awaited break in American base-metal quotations, for it can hardly be doubted that the fall of 2 cents in the price of lead, from 21¼ cents to 19¼ cents per lb. is the preliminary to a more extensive marking down of non-ferrous prices in the United States. Hitherto, metals have resisted the downward trend in some commodities in the United States, the principal reason advanced for this resistance being stockpiling which takes so much tonnage off the market. It now appears that the Government's activities in building up a strategic reserve is not in itself sufficient to hold prices, for lead is certainly in short supply. In relation to pre-war values, the lead price was, and still is for that matter, the dearest of all the metals. But there is no actual reason for the reduction, and it can only be ascribed to some falling away in sales to consumers. It is reported that the motor-car trade has declined and, consequently, the demand for lead for storage batteries has eased. This downward adjustment has introduced a note of uncertainty into the metal situation and traders are wondering whether the trend will spread to copper and zinc. At present there does not seem to be any indication of a break in the price of either of these metals, but in view of the very high level at which they are standing, the possibility cannot be ignored.

The reduction in the lead price has not assisted sentiment in the non-ferrous scrap market. Secondary lead has weakened still further, particularly as the restriction scheme maintained by the Ministry of Supply militates against the extended use of metal, whether old or new. In copper and brass the downward tendency has been in evidence and scrap has declined considerably. Heavy copper scrap is probably in the neighbourhood of £95 per ton, while H.C. copper wire cannot be much over £100. In brass, swarf may be valued at from £50 to £55, according to quality, and extruded rod scrap at just above £60. It is not easy to assess the value of the more expensive types of brass such as 70/30 cases, both small arms and shell. It is possible that a merchant might succeed in placing a parcel of Q.F. shell cases, in first-class condition and free from primers and all explosive matter, at, say, £100 per ton, for this figure shows a useful margin when compared with the value of 70/30 mixture calculated on the basis of virgin-copper and virgin-zinc prices. But the Ministry of Supply is hardly likely to receive any bids at £100 for shell cases which it has for disposal.

Gazette

POPLAR FOUNDRY, LIMITED, is being wound up voluntarily. Mr. C. Edwards, 33, Winckley Square, Preston, is the liquidator.

I. & S. ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Mr. K. R. Cork, 19, Eastcheap, London, E.C.3, and Mr. E. S. Smith, 10, Blenheim Road, North Harrow, Middlesex, are the liquidators.

THE COMPANIES' REGISTRATION OFFICE gives notice that the undermentioned companies have been struck off the register and are thereby dissolved:—ANTIMONY MINING COMPANY, LIMITED; STEEL BENDERS & FIXERS, LIMITED; TANKS, TUBES & CYLINDERS, LIMITED; ARGONAUT ENGINEERING COMPANY, LIMITED; FURNESS METAL & WIRE WORKS, LIMITED; JAYDEE TOOLS, LIMITED; MORGAN, DAWES & COMPANY, LIMITED, engineers, etc.; MULTICOOKER INVENTIONS (1922), LIMITED; W. E. S. ENGINEERING SERVICES, LIMITED; ISLAND ELECTRO-PLATING COMPANY, LIMITED; MAGDYNAMO ENGINEERING COMPANY, LIMITED; MOUNTSFIELD MOTOR ENGINEERING WORKS, LIMITED; ROYD MACHINE & TOOL COMPANY, LIMITED.

Recent Shipbuilding Orders

The following are among shipbuilding orders recently announced:—

CAMMELL LAIRD & COMPANY, LIMITED, Birkenhead, a passenger steamer for the Isle of Man Steam Packet Company, Limited.

SWAN, HUNTER & WIGHAM RICHARDSON, LIMITED, Wallsend-on-Tyne, a tanker of 28,000 tons dw. for the Anglo-Saxon Petroleum Company, Limited.

WILLIAM DOXFORD & SONS, LIMITED, Sunderland, two vessels of 9,000 tons for the Reardon Smith Line, Cardiff, and another of similar size for the West Hartlepool Steam Navigation Company, Limited.